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THE JOURNAL OF THE ROYAL INSTITUTE OF BRITISH ARCHITECTS

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JOURNAL OF THE ROYAL INSTITUTE OF BRITISH ARCHITECTS

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Journal

THE PRESIDENT

All members will join with us in offering cordial congratulations to our President on being created Knight of the Order of the British Empire. Official architect members will be gratified at so distinguished an award being made to an architect who has given long and outstanding service to the work of a local authority. The Royal Institute can also congratulate itself on having a President whose merits are recognised in the highest quarters.

British Architects' Conference, 1947

Readers will notice on Page 152 of this issue and in Notices in the December JOURNAL a brief reference to the holding of a conference in Dublin in June next. This will be the first post-war conference of the R.I.B.A. and its Allied and Associated Societies and is being held at the invitation of and organised by the Royal Institute of the Architects of Ireland. The last of the inter-war series of conferences was also held in Dublin in 1939 under the shadows of impending war. It is a happy thought on the part of the Council of the Royal Institute of the Architects of Ireland to begin again, as it were, where we left off. The Conference is being held from 11 to 14 June and a committee already has the programme of functions in preparation.

Lectures on Office Organisation

The third of the informal lectures in this series, entitled "Partnership and Profit Sharing," will take place on Tuesday, 4 February, 1947, at the Royal Institute of British Architects at 6.30 p.m. The speakers will be :—

Mr. G. Grenfell Baines [*A.*].
Mr. Raglan Squire [*F.*].
Mr. H. V. Lobb [*F.*], will take the chair.

Mr. Grenfell Baines will deal with working relationships in the profession and will discuss the question of rewards, recognition, and the opportunities and responsibilities which arise from certain types of group sharing. He will also give a brief account of the measures adopted for carrying out the aims and ideals of his organisation.

Mr. Raglan Squire will talk about the relationship of partners and associate architects in a firm, and of the advantages and disadvantages to be derived from abbreviated names for architectural firms. He will also deal with the question of the distribution of profits and staff welfare as well as with the relation which exists between clients and members of the staff.

Light refreshments will be available at a small charge from 6 to 6.30 p.m. for those coming direct from their offices.

The Annual Dinner

The Prime Minister, the Right Hon. Clement Attlee, C.H., M.P., has accepted the invitation of the Council to be the principal guest and chief speaker at the first post-war Annual Dinner of the Royal Institute. His Grace the Archbishop of Canterbury, the Most Revd. and Right Hon. Dr. Fisher [*Hon. F.*], has also accepted the invitation of the Council to attend and to speak. The dinner will be held in the Henry Florence Hall of the R.I.B.A. on Friday, 21 March, at 7 for 7.30 p.m.

This number of the JOURNAL contains a loose inset sheet giving full particulars of the dinner and a form of application for tickets. It will be noted that no member may bring more than one guest. Early application for tickets is advisable.

Exhibition of Danish Domestic Design

The first Exhibition to be held at the R.I.B.A. in 1947 will be of Danish domestic design. This has been arranged in collaboration with the Arts Council of Great Britain, the Council of Industrial Design and the Society of Danish Handicraft and Industrial Art. It is intended to show the way in which a Dane of moderate means can furnish his home and will therefore consist of furniture, textiles, table ware, kitchen equipment, toys, etc. Those who have been in contact with Denmark since the war will know that the very high standard of design which has always characterised Denmark has not diminished as a result of the war, so that an exhibition of high quality can be expected. All the items to be shown are in production and are new designs. The Exhibition will be opened on 21 February and will close on 15 March.

The Library Bulletin

The demand for the Library Bulletin having exceeded expectations, it has been necessary to order another printing of the first issue. Any further applications should be sent to the Librarian without delay.

The Bulletin reveals the international character of the R.I.B.A. Library, as many as seven different languages being frequently seen on a single page of the Bulletin. An analysis of the contents shows that 65 per cent. of the Review of Periodicals is devoted to architecture proper (13 per cent. preliminary subjects and 52 per cent. building types); town and country planning, etc., occupies 16 per cent. of space, as also does building technique; the remaining 3 per cent. represents the allied arts and art in general. In the Accession List 42.75 per cent. is devoted to architecture, 18.25 per cent. to town planning, etc., 34.75 per cent. to building technique and the remainder to other subjects.

Grouping of Work for War Damage Claims

The Architects Registration Council have received complaints of professional misconduct arising in connection with the desire of the War Damage Commission that all war damaged property in the same street should be grouped under one architect and one builder. Some architects have mistakenly assumed in consequence that they were justified in asking owners of property, by whom they had not been commissioned, to appoint them as architects for the purpose of their War Damage Claim. It is unprofessional and contrary to the Code of Conduct for an architect to solicit business, and in order to assist those architects who may be in doubt as to the proper course to pursue the following has been drafted to indicate the proper method of approach in such cases:—

DEAR SIR,

I have been appointed architect by Mr. ——, of —— Road, ——, in respect of his War Damage Claim.

The War Damage Commission desire that as far as possible the repair of war damage to several houses in the same street shall be undertaken by one architect and one builder. In these circumstances I shall be much obliged if you will let me have the name of your architect, if any, and if not, perhaps you will be good enough to let me know what arrangements you are making for the repair of your property.

Yours faithfully,

The R.I.B.A Journal To-day

As was only to be expected of a profession of which every member has strong personal views on questions of design, the opinions on the new series of JOURNAL covers, received in the office, range from warmest approval to chilliest dislike. However, the " approvers " so greatly outnumber the " disapprovers " that the new cover design can be said to have pleased almost everyone.

At the meeting of the Council on 10 December, Mr. A. L. Roberts, the Honorary Secretary, referred to " the great improvements which had been made in the JOURNAL in recent months." The Council endorsed Mr. Roberts' remarks and requested the Secretary to compliment the Editor and staff on the improvements.

All of which is very encouraging to the editorial staff. They do not forget, however, that their task is not confined to winning the approbation of the heads of the profession, but that it is primarily to make the JOURNAL of service to the individual member, and not least to the member who ploughs his or her lonely furrow in private practice or local authority office in the country, remote from the busy life of No. 66 Portland Place. It is from such members that the Editor would particularly like to hear, when they can spare the time to set down their opinions and suggestions in a letter. Every member of the Royal Institute is a part-owner of the JOURNAL and, although direction of the JOURNAL is under the control of the Council elected by members, every member is fully entitled to express his individual opinion—and his considered opinion will be welcomed, whether it be adverse or approving.

All the developments of the JOURNAL projected a year ago have not yet been put into effect. There are still one or two new features to be introduced during 1947, but the greatest immediate change will be the internal typography and arrangement. A new printing contract is starting with the February number and the opportunity is being taken to change the body type to *Times Roman*, which has the merits of being more easily readable, especially in the smaller sizes, and is of good typographical design. Incidentally, the small black lettering on the new cover is in the capitals of *Times Roman*. The title page is also being redesigned and the R.I.B.A. badge (lamented by a few members) is being incorporated there. Certain other changes of format are also being made.

Changing the printers of a journal is rather like changing contractors in the middle of a building job. Production cannot be held up while new printers become accustomed to the peculiarities of the work. Detailed methods of procedure, with which journal staff and printer's staff must be familiar, have to be re-established. Life is hard for some weeks; changing printers is indeed a nightmare. Fortunately this is only the second time that the R.I.B.A. JOURNAL has made the change since 1914. If there *are* any errors in the February JOURNAL, readers will know the reason.

Meanwhile, as was stated in the December JOURNAL, there will be *two* JOURNALS published in January as a sort of trial run for the return to the fortnightly publication of pre-war days. The new type will therefore be used in the next JOURNAL but one after this.

The Review of Construction and Materials

This number of the JOURNAL contains the first instalment of this series in its post-war form. From 1933 to 1939 it was a popular feature of the JOURNAL, being a commentary on the technical aspects of architectural practice. It was abandoned during the war, partly because many technical developments were official secrets, and partly because of depletion of JOURNAL staff. Perhaps it is as well to restate the " terms of reference " or guiding principles of this column. First, it is written solely from the point of view of the practising architect. Second, its scope is wide, covering appliances and equipment as well as forms of construction and materials; before the war it ranged from bell-hanging to bed-bug infestation. Third, it reserves to the writer complete freedom to include subjects or items he thinks to be of interest or of use to architects and, it is hardly necessary to say, has no reference whatever to the advertisement pages.

It will not necessarily appear in all numbers, depending on the available space. The same applies to other similar features such as *Practice Notes* and *Schools and Students*. The latter feature will appear in the second January number.

Journal—Index and Binding

It will be possible to provide a limited number of bound volumes as in previous years at the following prices :—

Buckram bound volumes	7s. 6d.	plus 7d.	postage.
Paper bound volumes	3s. 6d.	,, 6d.	,,
Buckram binding cases	5s. 6d.	,, ,,	,,

Early application is essential.

The Secretary of the Institute will be glad to receive back loose numbers from members who receive bound volumes.

Fuel Conference Reprints

The response by members and contributors to the proposal to reprint " Fuel and the Future " conference in pamphlet form has not been so large as was at first anticipated and it is regretted that the number of requests for reprints does not now justify the cost of reprinting the two reports of the conference, which appeared in the November and December R.I.B.A. JOURNALS. There are, however, a few copies of the November and December JOURNALS available upon request.

The Institute Accountant will shortly return any advance remittances received with requests for reprints.

R.I.B.A Diary

Tuesday, 28 Jan. 6 p.m. General Meeting. *New Towns.* Professor W. G. Holford, M.A., B.Arch.(Lvpl.), A.M.T.P.I. [*A.*].

Tuesday, 4 Feb. 6.30 p.m. Office Organisation, Discussion-Lecture. *Partnership and Profit Sharing.* Speakers: Mr. G. Grenfell Baines [*A.*], Mr. Raglan Squire [*F.*] and Mr. H. V. Lobb [*F.*]. Light refreshments available 6-6.30 p.m.

Wednesday, 5 Feb. 6 p.m. A.S.B. Lecture. *Noise Abatement.* Hope Bagenal, D.C.M. [*F.*].

Tuesday, 11 Feb. 6 p.m. General Meeting. President's address to Students. Presentation of Medals and Prizes.

Friday, 21 Feb. " Danish Domestic Design " at R.I.B.A., open to the public.

Tuesday, 25 Feb. 6 p.m. General Meeting. *Urban Housing—Planning for Amenity.* Edward Armstrong [*F.*].

Friday, 21 March 7. for 7.30 p.m. The Annual Dinner.

ASPECTS OF POST-WAR BUILDING TECHNIQUE

BY RICHARD H. SHEPPARD [*F.*]

A paper read before the Royal Institute of British Architects on Tuesday, 26 November, 1946

Mr. Michael Waterhouse, M.C. (V-P.), in the chair

It is unfashionable to talk of brave new worlds, to get up on one's feet and prattle about the opportunities which exist to-day for architects and planners and roundly assert that we are capable of building a new Jerusalem in a manner we shall find satisfying when it is completed. Few of us can be sufficiently confident of our architectural past to be vainglorious about the future. We do well to be cautious, we are uncertain of ourselves and of our architecture, and even though the community may be convinced that good architecture is desirable, they are clearly in doubt as to how it can be obtained. In the Reith report on New Towns is this paragraph : "There are differing schools of thought on architectural principles and the agency will have to remember this in the choice of its chief architect. Not every architect is prepared to admit merits in a school of thought differing from his own ; there will be corresponding divisions in public preference. . . ."

The times are uncertain and before we can plan the lives of others (a much less difficult job than planning one's own) we must decide where we are and where we want to go and keep checking our position. In this post-Mumford age we can only approach our problems with doubt, misgiving and humility—certainly not with the confidence of preceding centuries. We have inherited two legacies—a somewhat elderly revivalism and the conscientious functionalism of the twenties, and we are all aware that neither of them match up to the conditions they will encounter in the immediate future. We must, I think, modify the ideas which we had before the war if we are to function effectively as architects and if we are to set about the task of creating a new architecture.

I am concerned with technique to-night, not as an end in itself, not from the Government's angle as a means of providing shelter nor as an index to minimum conditions of living—the Ministry of Health's angle—nor as a problem in supply and demand and the distribution of labour, but with architecture, which is building beautifully and is the special concern of this Institute.

I can only deal with one very limited aspect—that of the relation between the design of buildings and the evolution of technique displayed in their construction. I do not propose to make forecasts about the adoption of this method of construction or that in relation to house or school design. Neither do I propose to attempt a summary of the changes which may have occurred as a result of the war. For one thing the war itself has only had the effect of accelerating or accentuating tendencies already apparent before—even the rise in wages. Indeed, there is nothing new ; even the prefabricated services unit was a favourite concept of Victorian thinkers and no doubt there were noble Romans with similar ideas. So I will limit myself to a discussion of the evolution of materials as they are employed structurally and to the ideas prevailing in our society about design. Ideas of this sort have always affected the introduction of systems of construction and modified their use and expression.

Design and Technique

Just now I said that the architect of to-day has to choose between two legacies—in some shameful cases he tries to combine them—what we might call the Victorian and what was called the modern. That, of course, is over-dramatising the situation ; the architect has to choose between the idealist conception and the pragmatic, and different times, different circumstances, will influence his choice. He has to choose between two attitudes to architecture. One is based upon the idea that a building does not so much express a function but an abstraction—truth, justice and honour are abstractions of this sort and they were embodied in the design of L.M.S. railway stations for instance, or fortitude and chastity were considered as suitable abstractions for a boys' school. The second attitude—that of the so-called modern architect, is concerned with the function of the subject and its expression is subordinate to this ; he is more anxious to know that crowds can enter and leave the trains and to ensure an adequate degree of ventilation in adolescent dormitories. The first essential according to this theory for good architecture, is that the purpose of the building must be satisfied in exact terms

(function) and that this process would, in its turn, determine the type of structure and, consequently, the materials to be used. A beautiful building is the result and is created as a matter of exact diagnosis. Both attitudes are necessary to architecture but they do not of themselves make an architecture. There is an essential fallacy common to both and each is a reflex of the social background of their respective periods. The Victorians maintained that man was made for monuments, the neo-Victorians that he was made for machines. The first attitude is moribund but the second still holds the field since it has been translated into the mechanistic theory of design, and has proved to be an excellent servant and a bad master.

To quote a recent and anonymous writer, "The reason for this incredible situation is not far to seek. The struggles to overthrow the Beaux Arts system, with its dead clichés of standardised design, proved to be so long and arduous that no instruction at all in design could be tolerated for a while. The eternal secrets where thrown away at the same time as the glib formula—the baby with the bath water—so that now the student has only either an arid functionalism to lean upon, or if he revolts from that, as the better ones do, he claims the personal right of the god-almighty artist to design as he sees best, responsible only to his inner consciousness." This theory was partly founded on a misconception of the part played by building materials in design. It was held that new materials must, if properly used, produce original and vital architectural forms. The arguments were never adequately developed by the theorists of the time but were first put about in a simplified and handy form, a declension to which architectural principles are especially liable. One has only to apply this theory to some random examples to see that it is not entirely true.

In architecture and building the same cycles, the same phases of technical development are to be observed as in other arts and sciences. First of all, no material is ever introduced as a sudden innovation. Nothing, I was almost saying, is ever invented, and no one person can ever be said to have invented some new implement or material which is important enough in itself to alter existing social relationships. Everything proceeds gradually, by scarcely perceptable movements along a line determined by much wider considerations. Arkwright was probably the first person to invent a spinning jenny which was practicable and profitable. He did not invent mechanical spinning. And while Stephenson is usually given the credit for introducing the steam locomotive, his invention was paralleled in half a dozen countries, even by an amphibious vehicle particularly suited to the exigencies of English travel.

That enables me to isolate one condition of the problem I am trying to discuss this evening. That building technique seldom or never proceeds by the abrupt introduction of a new material, by the replacement or substitution of a new one for an old, by the emergence of one material which is inherently superior in all respects to another. Furthermore, the development of a new material is seldom accompanied by the creation of forms which are characteristic of its physical and mechanical structure. Indeed, the first stages of development usually see it forced into an unhappy reproduction of the characteristics of the material it is intended to replace.

Materials, methods of construction, are never to be observed in a static condition, they are always developing, always subject to certain pressures and stresses created in society itself—like the social reasons underlying the architectural development in France during the eighteenth century or the dynamic established by the very force of the structural conventions in twelfth century Gothic.

When the Greeks substituted stone for timber in the temples, they were not using a new material, but one which they had long used in other ways, for example, in their tombs, and they were familiar with its physical characteristics. Even so, they reproduced a system of enrichment based upon a timber technique. Again, when cast iron was first applied to building in the nineteenth century, it already had a long tradition of use and was being employed in bridge construction. But it was not introduced exclusively for structural purposes—indeed that phase came rather later, but as cheap imitation of stone forms. The Crystal Palace, the only complete use of iron in this country, came late in the development of cast iron as a structural material and was almost its final monument.

It was also held as a second article of faith (new materials create new forms, to quote Corbusier) that new materials—whatever they may have been—when built as a container even for old uses (like sleeping and eating) were somehow to result in a new and daring æsthetic, in which the traditional and therefore unsatisfactory shapes were to be swept into limbo. How far can we rely on this assumption as a guide to conditions in the immediate future?

In the first place where "new" materials were introduced they only found themselves properly used (i.e., with a full realisation of their physical properties) where they were exploited to meet the new apparatus of industry—that is in the stations, the warehouses and the wharves. Secondly, that traditional types of building did not demand new materials—since their form had for so many centuries been modified by the materials available, in fact until our modes of life were based upon these forms—and that where steel and iron was used for such types of building small regard was paid to their constructional properties. Perhaps the best examples I can think of in support of this contention lies in the introduction of cast iron to the Commissioners' churches in the 1840's or in the use of steel and wrought iron by Horta in Brussels and Hoffman in Vienna at the turn of the century. Lastly, and worst of all, we have witnessed the deliberate reproduction in new materials of old techniques—that most familiar and irrational part of the daily struggle of designers to educate their betters. This is perhaps the most common error of all—what psychologists would call a deviation of aim.

This serves to point the fact that many of the axioms adopted in the 1920's were based upon Victorian art ethics and Victorian technique by which a work had, as I have said, a moral standard independent of its purpose. Ruskin, in *Modern Painters*, "the preference accorded finally to one school over another, is founded on a comparison of their influences on the life of the workman"—the Pentonville school of architectural design.

These tenets,

1. that new materials promote new forms,
2. that new materials because they provoke new forms will lead to new forms of traditional building,

do not, therefore, form a very satisfactory theory and upon them a good deal of our rationalisation about a new architecture is based. We wanted new forms and we had to be prepared to justify them. But it is just as well to get underneath the defence mechanism.

These principles formed the basis of much of our own thought about architecture in the twenty years before the war, and I will show how they were applied in different fields so that we shall know the commandments when we next break them.

First, what were the "new" materials which were exploited during this time? Steel and reinforced concrete are perhaps the most obvious examples, although introduced long before this time. The immense plastic possibilities suggested by concrete seemed to overarch every other consideration during those years. It seemed like a fourth dimension, the possibility of realising a kind of Coleridge dream of vaults and shapes, of being the final answer to the problems of spatial enclosure. In a way I suppose reinforced concrete does offer everything to the designer so that building can become a purely spatial exercise. In a small way you can see this happening in some of the work done by Tecton at the Zoo. Yet what are the results in the larger realm? Some superb bridges by Maillart in which the material appears to be used finally and decisively, but so far as building is concerned, a mere handful of experiments. Some of them are of great technical interest—cellular concrete construction, monolithic r.c., shell concrete—all forms exploiting the possibilities of moulding shape to our convenience and fancy. Unfortunately a reinforced concrete structure and form was often

imposed arbitrarily and the material was pushed into shapes for which there was no justification in the nature of the material itself. For r.c. construction depends upon the board for its shuttering whether in steel or wood and upon the steel rod for its proper and these must be bent and fashioned. It is my contention that the material still lies largely undeveloped and that in its early stages its possibilities have been obscured by indiscriminate application which often ignored other physical considerations and that we have a new and exciting possibility to realise. Bentley was the last person to build domes on a big scale in this country and it is high time we put this element back in circulation again. The column and the beam have been selected as being the characteristic forms of this century and I do not know why such sound structural elements as the dome, the vault and the arch have been neglected—anyway in reinforced concrete design.

But I believe the most important contribution in this epoch will prove to be the development of the building board or sheet. This will have a potential affect upon building technique and design greater than any other introduction in the last hundred years. The board is not only important in itself, as a means of construction and as establishing a rhythm of design, but it sets off a chain of other materials and releases a whole field of techniques. Boards are already in manufacture or projected which can perform almost every demand made upon them physically, of strength and insulation. And they can be moulded, reinforced, armoured and transparent. These boards may eventually prove to have a greater significance in building technique than r.c. They have not yet been developed for building and their field is strictly limited at the present time. They are precision materials—of predetermined strength and performance and belong perhaps to the more precise standards which seem likely to govern building technique in the future. No real suggestion of their possible importance in the future is to be found in the studies published by the Ministry of Works. This is perhaps unavoidable, since reports of this type, sponsored by a Government department must be factual and immediate.

It is difficult to assess the effect of these materials upon architectural design during this period. Although concrete became a kind of popular anathema and became associated in the public mind with what it believed to be modern architecture, these superficial effects can be discounted since they only affected the fringes of the profession and appeared in a tattered form among the jerry builders.

When applied to building structures rather than engineering these materials were sometimes used in distorted and exaggerated forms. The application of reinforced concrete for instance, to housing often resulted in the imposition of arbitrary shapes and patterns upon a traditional form and bore no relation to the life of the occupants, and since the form was irrelevant it was very seldom appreciated. Indeed, in some cases it was hard to know whether the tenant was designed for the building or the building for the tenant. Such forms were therefore abstract in the sense that they represented conceptions of design which appealed only to the designer and the initiates. It was a design for a limited school and a limited public. Indeed, to put my point shortly our best architects were often designing at a long distance from popular taste. Far from giving their work an expression which could be understood at large they were forced, not so much by their own wishes as by the general trends of art forms to create an architecture distant in its appeal to the everyday emotions. I believe this to be one reason why so many crude and simplified slogans like " Fitness for Purpose," " Functionalism " and so on were adopted. It was a desperate effort on the part of the designer to get himself understood. The result was a romantic attitude towards materials or towards functions and services which were exploited for their own sake and which were often unnecessary. Services, planning and structure were often exaggerated to provide an excuse and a justification for the manner desired by the designer and style was dominant. The work of that great creative architect Corbusier, sometimes appears a little unreal and relates to intellectual concepts, to painting and to sculpture, and his buildings, blocks of flats and houses are often in the nature of stage sets, overdramatised and accentuated. Where the function of a building, and consequently its structure, provided a natural opportunity, or where a building was conceived directly, in its own terms, as structure, there was a different result. As Lethaby says, " Nothing looks well that has been done for 'look.' It appears right at first but quickly the doing becomes diseased. Only by being intensely real can we get back wonder into building once more." Thus Maillart and Asplund seem to be supremely important to us to-day since their work is at first hand as it were, concerned with the problem rather than its abstract expression. The difference between these two schools is due to a mistaken application of these two concepts—the function of building materials in architecture and to the importance of the purpose of a building in determining its form.

Science and Design

In considering the influence of the inter-war period we cannot afford to overlook the contribution made by science to building technique. This is a reflection of the growing importance, not only of scientific advances, but of scientific methods in our public and private life. The reaction to this is rather similar to the attitude of mind induced by the introduction of the machine and the arguments used against it are an echo of those used by the Arts and Crafts Movement. To many science appears like some new form of social organisation which threatens their established standards and values. Indeed, in the sense that science seeks to place life (and building) on a methodical basis and to replace empiric and opportunist thought, it is disruptive. But science is not inimical to art and these two forms of activity are complementary to one another. Architecture faces no Hiroshima.

Architectural science has a compelling and comprehensive function—but one which can be exaggerated as easily and as dangerously as it can be ignored or minimised. The architect has always used scientific methods, so far as these methods could be used, in dealing with his problems of spatial enclosure. The Mediæval building, the architecture of Renaissance, were both concerned with problems effecting the stability of masonry, but they were forced to rely on experience and craft traditions where we refer to statical methods of determination. This may account for the superiority of craftsmanship in previous epochs and for its decline in our own.

Naturally the first field in which scientific methods were used in architecture were in determining the permissible stresses in materials. In the last thirty to forty years the branch of applied science has been fairly accurately defined, though in narrow limits, and the strength of different units can be accurately determined.

I suppose the most direct contribution made by scientific investigation has been the study of the characteristics of materials and their behaviour. On the whole, such research has tended most happily for all concerned to verify the rule of thumb methods followed by tradition and to bring out certain chemical or physical principles governing the uses of materials in traditional building practice.

The war, however, has seen the publication of two extremely important reports—the Burt Report and those on Lighting, Heating and Ventilation. These reports, as you are aware, lay down certain standards for different types of building and cover very broadly what may be described as standards of physical wellbeing. They mark a great step forward, not so much in the matter of building technique or in the official recognition that such standards are necessary but that we have now arrived at a point where it is possible to implement them exactly. Indeed, it is not too much to say that building science is rapidly approaching the position where standards of performance, both in materials and in building efficiency can be accurately predetermined. At the lowest they enable the architect to avoid critical mistakes and at best to present him with accurately defined alternatives

between which an æsthetic choice may be made. For this reason building science should have an integral part in architectural education, complementary to design—a conclusion entirely different from that envisaged in the report of the special committee on Architectural Education recently published by this Institute.

Now all this is due to the scientific research carried out in the last twenty or thirty years in building technique, but the total effect or influence of science upon architectural forms is as yet small. For one thing such standards are necessarily concerned with the consumer, with convenience rather than with beauty. The scientist is primarily concerned with matters of fact and not of opinion, to measure rather than to suggest. In the last few years building science has begun to make great strides and although this development is limited in its objective, it has reached a point where it will enrich and diversify architecture, and give a sure and certain background to imagination. To take one instance, the work which is now being done in daylighting, in the effect of light contrasts and intensity, must clearly have an enormous effect upon design, in the proportion and arrangement of windows as well as wall surfaces and textures. We are badly in need of such guidance and I believe that the scientist will help us to find and replace that intellectual and emotional content which has been so sadly lacking in architecture. But these in themselves we may be sure do not make architecture, and we must beware of the confusions of the functionalist approach or extend the definition of this term to include those emotions which we have found in the architecture of the past. We may design a classroom, for instance, exactly in accordance with the various recommendations of the Study Reports and it will probably be a very good classroom in a physical sense, but it will not necessarily be a human and livable room. The different and unrelated factors must be integrated by the designer.

Post-War Conditions

The special conditions which we face at the present time favour a more experimental approach, and as our problems are communal in pattern rather than individual the greatest task which we have to face is of relating the prejudices and desires of the individual to a coherent æsthetic pattern for the community as a whole. At the lowest level the desire for the semi-detached house may be set against the social utility of the terrace, and at the highest are the problems of town and country planning, of creating that balance between the individual and society, between opportunism and method, between flexibility and control, which is the central problem of government.

I have mentioned housing as an instance of that continuity in form which is the result of a continuity of function, but housing is also an excellent instance of the way in which the emergence of new material and new techniques will modify our ideas on a given building type although often without affecting its essential form. It is my contention that such alterations will only be brought about by modifications in the demand and by the social conditions in which they operate. The architect, working solely from within, so to speak, is seldom successful in effecting such modifications which live as aberrations peculiar to him or his client.

Laws of supply and demand operate in the building industry as in any other field, although they are mysteriously affected by fashion, by the force of example, by the predilection of a gifted designer for one material or another. It is high time that somebody studied in some detail the conditions affecting the introduction of new materials into design. We still need, as Lethaby once remarked, a new science of building morphology.

With this in mind let me turn to some of the factors which are likely to develop in the next few years on the technical side. It is clear, however, that the circumstances of our civilisation and the immediate expansion of the building industry will lead to an increased use of factory made materials, to materials having a precise performance and definite physical characteristics, steel, asbestos, and all those mysterious mixtures and sandwiches which result in the ubiquitous board.

Before the last war there were just two categories of structures, sheds and building, but we now have an exhaustive and complicated nomenclature which is in itself an indication of our developing attitude towards building technique. We talk about buildings under names like semi-permanent, temporary prefabricated, permanent prefabricated, light frame, and the list could be multiplied. If you regard architecture as the sum total of buildings which the community uses and by which it expresses itself, rather than as a series of isolated monuments in a wilderness of shacks, a condition which very accurately describes many of our towns to-day, you will see the difference created by changes in building technique in our attitude to architecture.

A greater precision in the use of materials is also coming about. This is produced partly by temporary conditions which demand economy in means, in both labour and materials, but is part of the increased control of the physical conditions governing building. There is no need to waste material because the factor of safety is unknown. Precision in the selection of materials with a greater range, leads to a greater diversity, a wider range of effect, to more subtle and complex rhythm and definitions.

Related to this is the development of factory-made components and assemblies and to the complete standardisation which must be developed if these are to assume their full importance. Factory-made assemblies for service and plumbing, for partitions and wall panels are by now familiar objects to most of us and they do no more than accentuate a state of affairs which is related to general industrial development and which has been accelerated by State responsibility for various types of buildings. These components may or may not be developed on a longer term for their use is partly related to other external factors, coal economy, district heating, as well as to the complexity of equipment required in a modern building. There is less point in prefabricating an article costing £20 than in one costing £200.

This certainty in the use of materials will avoid those intellectual fripperies, those stylised clichés of the inter-war period and will give us a solid basis on which to evolve a new grammar of style—to an extent they will relieve much of the drudgery of design and enable us to concentrate on the architects' real task.

A further factor which we cannot neglect for its social importance alone, is the decline of the craftsman. This, I am afraid, is a positive and absolute factor whose importance in building we have not yet assessed. It may, of course, be corrected in years to come when the immediate drive for production is less urgent but craftsmanship in the sense that we have known in the building industry, in elaborate forms of brickwork, masonry, plasterwork, and joinery, will not, I think, be revived for many years to come. It must, however, be replaced by other qualities, by surface texture, and patterns, which are potentially as rich as those which we are losing even though they are of an entirely different character. In architectural design in the inter-war years the craftsman was largely eliminated and we concentrated on the re-discovery of shapes and planes in forms which were unfamiliar to the general public. The process was necessary but much was lost in the course of it. We have an opportunity in these coming years of redressing the balance by substituting for the elaborate craftsmanship of the past an appreciation of surface and texture, of rhythm and colour. We have scarcely begun to exploit the possibilities of modern technology, and we have all been cheered in this respect by the course of architecture in Sweden and Switzerland. Here we begin to find an appreciation, which is their special contribution to peace, of those enduring factors in architecture, of form, proportion, rhythm, contrast, modulations of mood and expressions welded into a contemporary form and exploiting the resources of modern technology, structurally and decoratively. Here we find an endeavour towards perfect structural efficiency coupled with a recognition of the decorative possibilities involved.

Congress Hall, Zürich

First of all as you go in, high above is a canopy of brightly painted sheet metal strips, and the structural pattern involved in the use of this material has been invoked by the designer to form

a gay and interesting pattern. When you go inside the building you are struck by the controlled elegance and its effect. There is nothing harsh or arid and the effect is compelling and complete. It is this sense of completion, of mastery and delicacy, variety and unity that I want to stress. Buildings of the Renaissance have this sense of completion—that the effect was what was intended—neither more nor less, and nothing could be added or removed. And this is achieved by a complete study of the different physical and structural requirements in terms of formal, decorative expression. Thus the ceiling of one section of the building has a pattern of octagonal timber rosettes and these are used to brace some insulating glass silk. The building at Zürich is just one instance of the kind, and there are many others to be found in Switzerland and Sweden.

I have already reached, as you see, the effect of these changes in building technique upon design. I do not think that an architect can ever look at the matter objectively. Every change in building technique brings with it a corresponding modification in design. But the examination of these changes in technique, provided the approach is creative, concerned to exploit for our pleasure, will reveal unsuspected potentialities and virtues which, although foreign to traditional conceptions, will be assimilated in design. As I have remarked we never stand still in either one field or the other, and if the architect does not seek to control and utilise these developments they will occur without him to the detriment of society as a whole.

We must also consider to a far greater extent than we did before the war, the emotional contact offered by our buildings. Much of the best modern work must now appear arid and we are in danger of forgetting the associations which man has with certain types of building. He looks at a building to express many of the emotions and loyalties he feels. Almost every writer, from Lethaby to Gideon, has reminded us that people seek from architecture, as from all the arts, " an expression of their aspirations—joy, excitement, even luxury."

We live in a democracy and the state and local authority through which democracy operates are agencies responsible for most of our building in the immediate future. The public are likely to be increasingly critical of the buildings erected for communal use. This in itself is bound to affect the attitude of architects towards design. Buildings are no longer provided as a matter of charity for the alleviation of suffering or for the distressed, they are demanded as a right, and this also means that their occupants shall have an increasing say and interest in the forms which will be the background to their lives. There is a greater interest in architecture and in planning than has been apparent for many decades. It is presenting us with a tremendous opportunity of creating in this country another Augustinian age, of creating a standard of public taste and appreciation through which a real living, vital and contemporary architecture will emerge with a language of design understood by all and permeating over every single factor of our daily life as it was once in Mediæval Europe. If we seize this opportunity, if we recognise those permanent aspirations and ambitions, latent, but not expressed by the ordinary man, and satisfy them in our building we can go on a long way to creating these conditions from which great architecture can emerge. So we come back to the beginning. We must understand ourselves and our work and that means the comprehension of the means we have of building to-day, their potentialities and their limitations, in precise terms. We must revise some of those concepts which governed architectural thought in the 20's and 30's and which, as I have tried to show, resulted in forms which were often irrelevant, and of hopes which were evanescent. We must also take into our account the feelings of our client, increasingly the public at large, and relate them to an evolving technique of building so that we may create what we have needed for nearly two centuries—a style of architecture understood and accepted by all and not by the few.

DISCUSSION

Mr. Hartland Thomas, M.A. [*F.*]: I am sure you will agree with me that the range and speed of Mr. Sheppard's thought are most striking, and any one of us, prompted by what he has been saying, could get up and talk lucidly for the next three hours. He has shown what an extraordinary range of ideas and important considerations we have to carry about with us in our work, and in fact all the time. There is no short cut. He made it quite clear that he expects himself, and we must expect ourselves, to have in mind all these considerations of art and science, of sociology and æsthetics; and, above all, it is necessary to remember that we have to keep all these things under control.

Personally, I agree with nearly every word that he said, but I would join issue with him on one point, which is probably an unimportant one now. I think that his criticism of the mechanistic theory of architecture is falsely aimed. I do not believe that any of us held that crude mechanistic theory about 1930. Mr. Sheppard and I were at an architectural school together in those days. I was not thinking that, and I doubt whether he was. Was anybody? Is not it an Aunt Sally that is stuck up merely to be knocked down?

I do not think that it is necessary, being, as we believe we are, in the early days of a new Augustinian Age, to stand on the rung of a ladder and, as it were, kick the 'thirties in the face before we can go any further. I do not, therefore, agree with what Mr. Sheppard says about that, but for the rest I am in agreement with him. Particularly interesting was his forecast that sheet material held in itself immense potentialities. I myself am very much more strongly drawn towards designing in the light and dry construction than towards designing in the wet and heavy, and I think that that is what he was driving at.

He obviously wishes to utilise to the full the potentialities of architectural science, always making sure that the science is made architectural before we use it. I should like, however, to carry some of his suggestions a little further. I think that some of the careful analytical methods which we apply to materials, to questions of heat transfer and sound insulation and so on, might also be used in examining our clients; because the client nowadays is the whole community, and we are unable to buttonhole him and interview him in quite the way in which we can cross-question a private client.

We live in an analytical age. We have to argue about things and delve into them, as we have tried to do this evening. Have the sociologists something to teach us, even about the art of architecture? It is not that the solution is to be found in that way, but, if we can arrive at more understanding of people's emotional needs, that understanding may give us more confidence in design; because we need an understanding of what we are doing; we are not good at doing things instinctively.

Is the sociologists' concept of an emotional symbol, a concept also used by psychologists, something which we could use for the understanding of the emotional content of architectural forms? It is not unlike the quotation which Mr. Sheppard gave from Ruskin on the moral qualities of building, but it has a modern slant; it is something which may make sense to us, whereas these moral qualities seem to make the most priggish nonsense. I should like to suggest that possibly in the examination of social symbols and the drama that we may enact in architecture in putting symbols in opposition we may have something which will go a long way towards giving the public the architectural design that they need.

One never knows when proposing a vote of thanks whether to start making a speech oneself, but I hope that it will be taken as a compliment to Mr. Sheppard that his remarks have prompted mine, and I have great pleasure in proposing a vote of thanks to him for his paper.

Mr. Robert Fitzmaurice [*Hon. A.*]: I have enjoyed this paper enormously, and for a very personal reason. For quite a long time now it has been my duty to work on some of the scientific aspects of the development of new techniques of building, with special regard to the difficult times through which we are going at present. It has been necessary to find what new techniques might contribute to our present urgent physical needs. There are times when a definite stage is reached in this work and a new technique is born. That does not happen very often, but one sometimes does find a thing growing in one's hands and it is possible to say that here there is a definite departure. When that happens, I confess that I have often thought, " Well, what is the architect going to do about that? " To have had, therefore, the philosophy expounded by a person such as Mr. Sheppard has been very inspiring. It is satisfactory to know that people like Mr. Sheppard are developing a philosophy which is perhaps the rational exploitation of these techniques.

Coming to the paper itself, I should like to take exception to one or two of the things that Mr. Sheppard said. Mr. Hartland Thomas took him severely to task for dealing rather brutally with the func-

tionalism of the inter-war epoch, and I felt inclined to remonstrate a little with him on the same ground, but for a different reason. He hit out at the "reinforced concrete style." Le Corbusier and others evolved a distinct style to which the name "reinforced concrete" was attached, and then the speculative builder "improved" on it and did the same thing in brick, rendering it to make it look the same, thus tending towards its ultimate degradation. But it is not fair to use the term "reinforced concrete" there, because many of the very magnificent and perhaps almost timeless buildings which were put up in that period were in fact very largely reinforced concrete buildings, in the sense that all the work was done by reinforced concrete. That was not obvious when one looked at the building from the street, but the loads were all taken by reinforced concrete and the building climbed to heaven by virtue of the fact that it was a reinforced concrete building. Nobody would call those buildings an error in taste, and it would not, perhaps, be necessary for the basic material to be expressed to give character to the outward shape or even to the inner surfaces.

A very important point, and one of which due account ought to be taken, was raised by Mr. Sheppard when he referred to the decline of craftsmanship and all that that implies. Although we are inclined to lament the decline of craftsmanship, there has not in actual fact been any decline of craftsmanship at all. What people are lamenting is the passing of the operative who very laboriously fitted little jig-saw pieces together in very adverse conditions, standing on a scaffold in a north-easterly gale and driving rain, and of the man who put beautiful tiles on roofs in a baking sun—and there can be few things more unpleasant than tiling a roof for hour after hour on a very hot summer's day. That was the work of man's hands, and when it was well done it looked very lovely.

But we have not done away with craftsmanship; we are just as dependent on the craftsman as ever, but he is a different craftsman. We may have to deplore the fact that some of his craft is not obvious to the outward eye, and that it is only the man who knows who can appreciate where this beautiful craftsmanship lies, but what has happened all through industry is that the fine craftsmanship goes back into the tools. That has happened also in the newer techniques of building. The main point about the newer techniques of building is that the bits of buildings are made with ever greater and greater accuracy, so that they fit together very much more quickly and easily, and also we devise means of making very large numbers of them. The basis of it all is that the bits fit together accurately, so that there is much less fiddling about to be done under the adverse conditions of the building site.

In order to get that perfection of fit in these bits, that degree of accuracy in their making, we have to have the finest of fine craftsmanship somewhere in the background. It may lie in making the moulds, the tools or the jigs, and so forth, but there has to be this really superfine craftsmanship somewhere in the background all the time. People who know and who think about it will realise that, and will look at a building and say "Some fine workmanship and thought went into the toolmaking behind that job!" Those are the true facts of the matter. There is superfine craftsmanship behind the apparently craftless building.

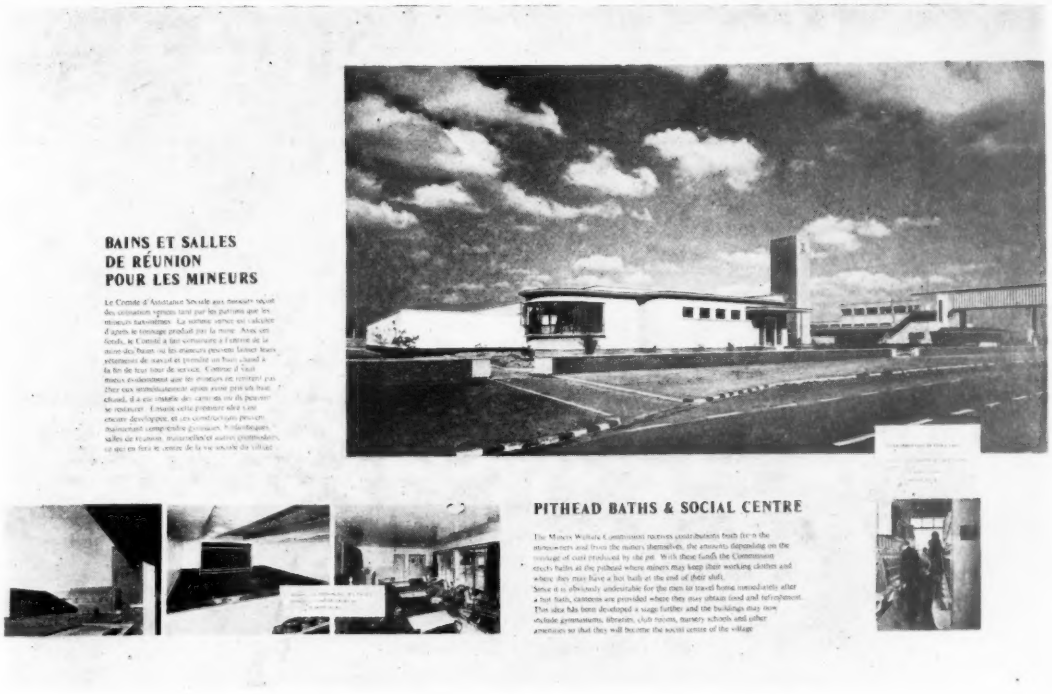
I wish that I were an architect and could have the privilege of using this superfine modern craftsmanship. Think of the possibilities that it opens up for you! It is on that note that I have very much pleasure in seconding the vote of thanks to Mr. Sheppard for what I consider to be the very valuable work that he has done in putting this thought into the philosophy of a very difficult subject.

MR. E. W. CLARK [*S.*]: Would Mr. Sheppard enlarge on the philosophies developed in Switzerland and Sweden to produce better architecture, or the promise of better architecture? Is he able to say anything about that?

MR. RICHARD SHEPPARD: I can only say that I think it is a development of what has gone before. I should like to take this opportunity of correcting the impression, if I gave it, that I am anxious to set up what one may describe as the mechanistic school of architecture in the twentieth century as a cockshy. Not at all. I wanted to make it clear that that forms a valuable foundation on which we have to build to-day. It is only in its narrower interpretation of functionalism that we have a dry, intellectual approach. I think that what has happened in Sweden and in Switzerland in the last seven or eight years has been that they have again put the humanities back into architecture, from the point of view particularly of the public at large; and in doing so they have utilised to the maximum extent the resources of modern technology and building science to provide for those formal qualities, those qualities which I described as "emotional" for lack of a better word, and which carry right down, so to speak, to what was described in the Renaissance or nineteenth century as decoration. Instead of putting a mere repetition of birds or some other formal pattern used in those days round a room or a building, they seek to find the content which those things had at one time and the significance which they had for those civilisations, and to use something derived from our own technical and scientific resources for dealing with our own problems. Particularly in some of their more recent buildings, we begin to find in the technique of construction adopted and in the use of materials for non-structural purposes such as balconies, canopies, windows and soon, recognition of the emotional qualities which I think that we require in our building. I do not think that at its best the approach of the 'thirties was purely pragmatic (I prefer that word to mechanistic), but the theorists of the movement did not allow for it, and in its tenets it was very close to the mediæval school of psychology.

In reply to Mr. Fitzmaurice, once again it is perhaps a matter of emphasis. I did not, perhaps, make it clear that some splendid buildings were built in reinforced concrete before the war, but I think that an attempt was made to produce a style before the technical considerations for that style were properly established, and I took reinforced concrete as an example; but that is also true of a number of other materials and of other buildings built at that time.

As regards craftsmanship, I do not altogether agree with Mr. Fitzmaurice, because by "craftsmanship" I mean a degree of manual ingenuity or dexterity applied *in situ*. Working to fine tolerances and the fine assembly of manufactured parts are factory processes, and rely to a very large extent upon the designer, the tool-setter and the whole of our industrial processes to-day. I think that that is what we have to offer in place of craftsmanship, but by "craftsmanship" I mean a kind of manual dexterity, an inherent sleight-of-hand, such as was shown by the plasterer or the joiner, for example, in the Renaissance. We have to find its equivalent in the content of our buildings by the fullest use of modern technology, and it is my contention that we did not apply this in the inter-war period, but were tending to make statements without following up the implications of those statements to the creation of an architecture. It is that which is our present task.



A screen illustrating the work of the Miners' Welfare Commission.

U.N.E.S.C.O. EXHIBITION, PARIS

"BRITISH ARCHITECTURE——1939-1946"

The R.I.B.A. Exhibition Committee, in collaboration with and at the request of the British Council, prepared a series of screens for inclusion in an international exhibition which was held recently in connection with the first General Conference of U.N.E.S.C.O. in Paris. The British contribution was sponsored by the Ministry of Education.

The exhibit, consisting of eleven large panels, was based on the "Building Now" Exhibition which the R.I.B.A. produced in April of last year. The panels, of which samples are illustrated here, were executed by the Design Research Unit in conjunction with Peter Ray. The panels show very briefly some of the essential building and planning which was carried out by British architects during and immediately after the war years.

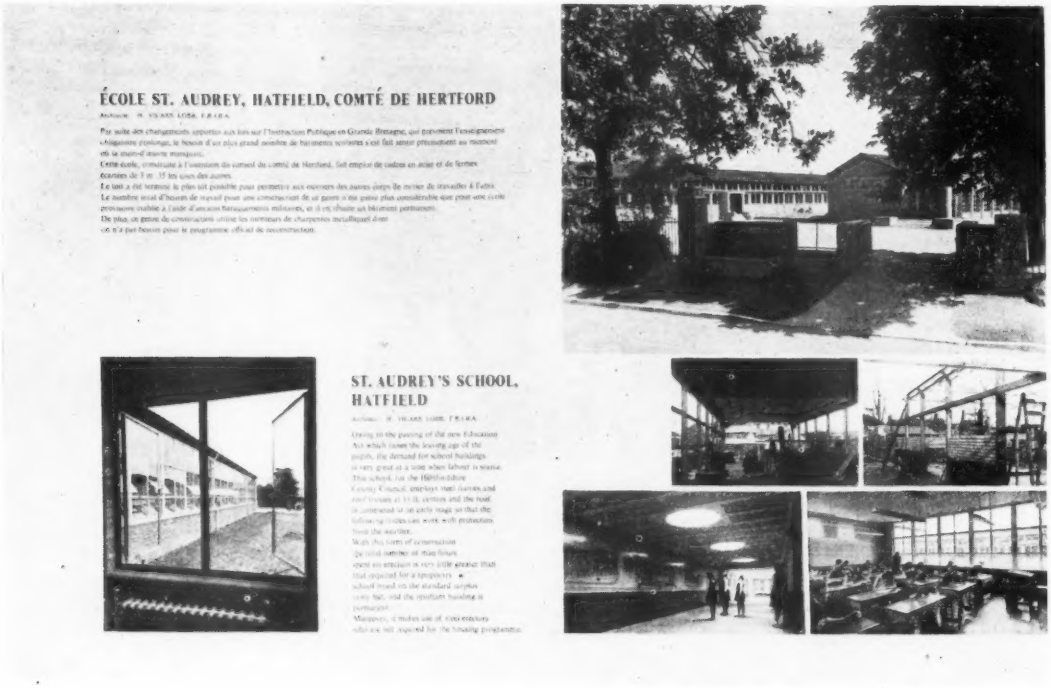
The text, in French and English, emphasised that the British Government's programme now demands that four million houses shall be completed within the next ten years and that this work must proceed side by side with the repair and replanning of bomb damaged cities and the erection of the hospitals, schools and similar buildings which are essential for the life of the community.

It is stated that the war-time housing was built, in spite of shortages of material and labour, to house essential workers close to rapidly expanding war factories. Industrial hostels were also built for security in remote country districts for workers in essential factories; these hostels had to house workers of both sexes and to give facilities for recreation and entertainment.

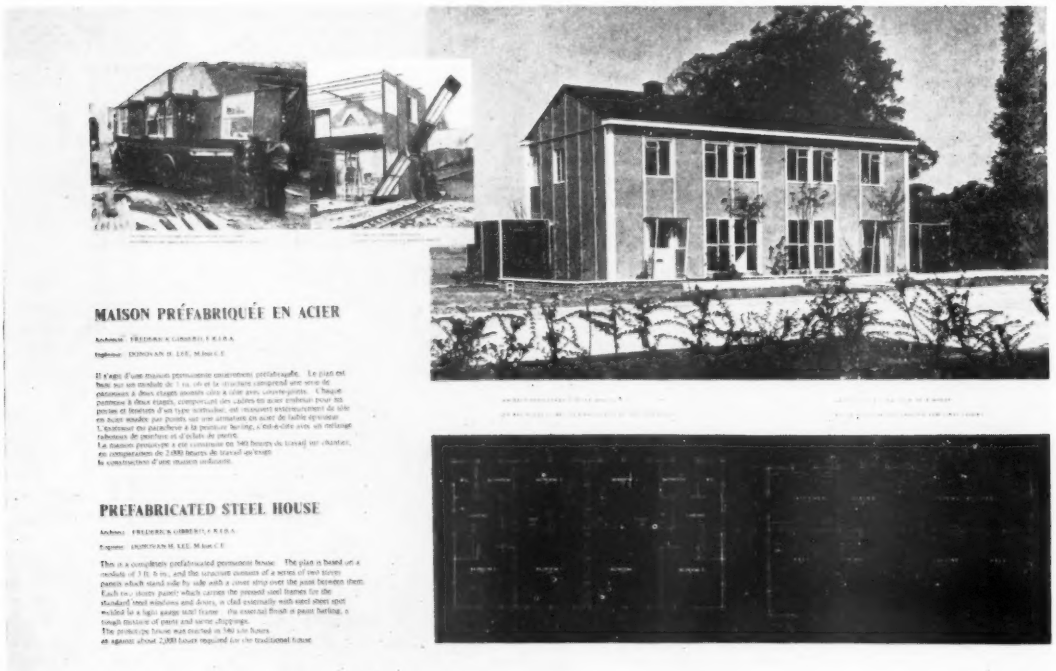
The panel dealing with municipal housing illustrated the redevelopment of blitzed and blighted areas; plans and photographs of models of schemes of small houses, of flats, terrace houses and old people's dwellings were shown together with the communal buildings now considered necessary. One panel dealt with the use of prefabricated housing, both to meet urgent needs and as a permanent contribution to solving the housing problem.

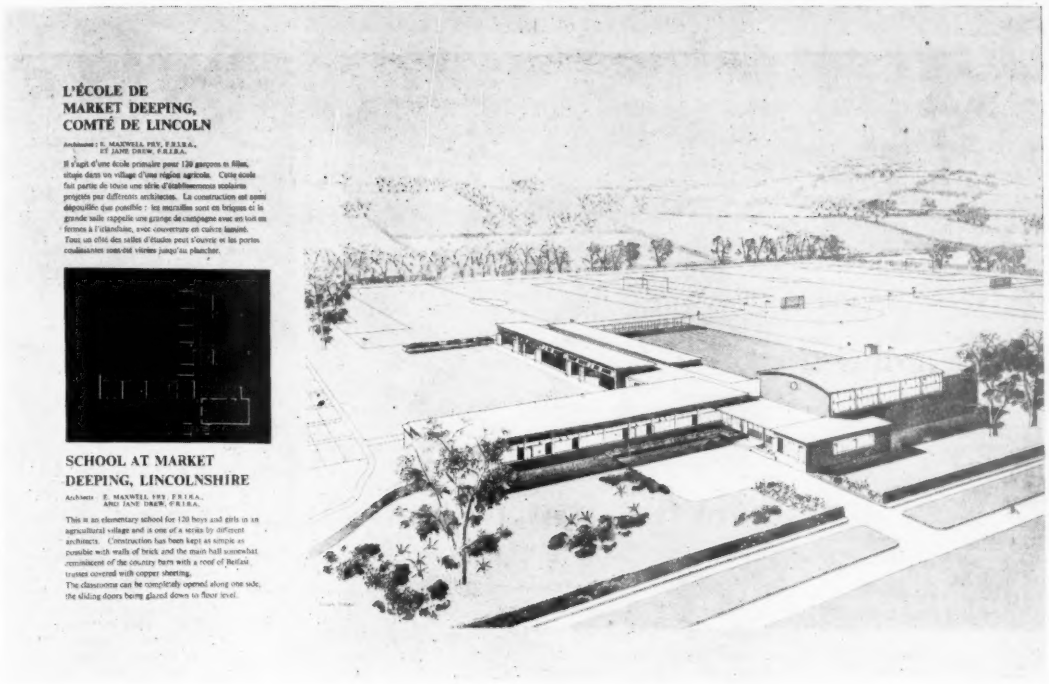
The work of the Miners' Welfare Commission was illustrated by pithead baths, canteens, community centres, etc., while the recent expansion of its plans to include gymnasiums, libraries, club rooms, nursery schools, etc., was mentioned. It was also pointed out that this work is financed by contributions received from both miners and mine owners. An interesting project for an all-electric colliery and miners' training centre was also shown, being the first occasion on which a complete range of colliery buildings had been designed by an architect.

The wide scope of the new Education Act and its effect on the demand for new school designs of all types, was illustrated by means of an elementary school for boys and girls in an agricultural village, a council school planned for quick erection and an infants' school made up of sectional units. A rural secondary school containing a village community centre and special accommodation for technical training, etc., was included. The work on hospitals was illustrated by the scheme for rebuilding the out-patients' department of the London Hospital for Sick Children. Finally, as an outstanding example of contemporary architectural design, the project for the new elephant house at the London Zoo was illustrated with the accompanying statement that it would be built only when priorities, such as housing, had been satisfied.



U.N.E.S.C.O. Exhibition, Paris. Screens illustrating rapid erection of schools and prefabrication of houses.





U.N.E.S.C.O. Exhibition. A second screen illustrating schools and one on hospitals.

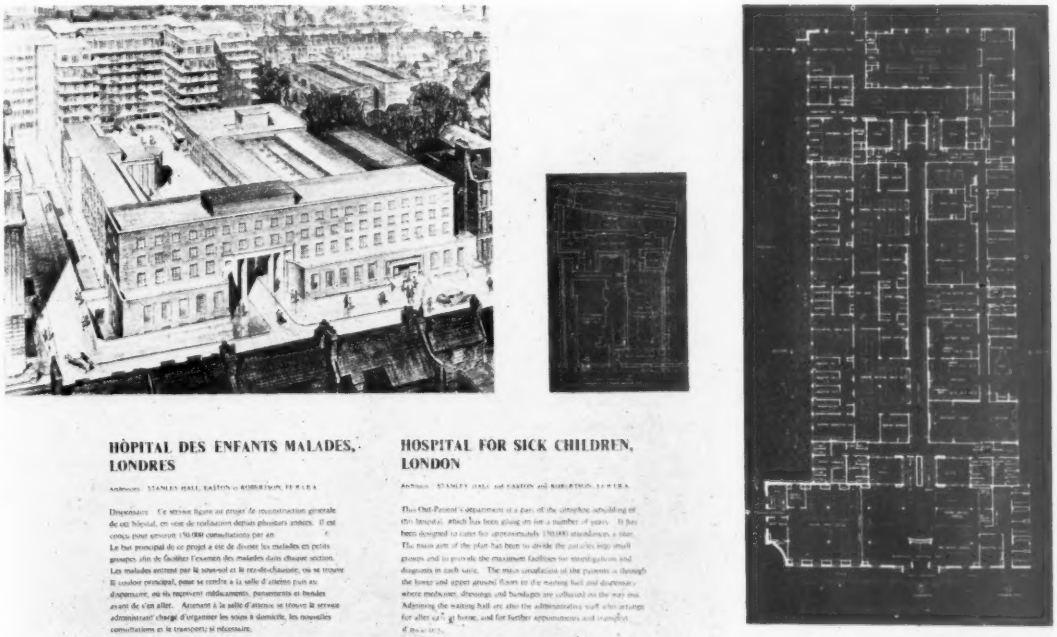


FIG. 1.—*The six experimental (flat-roofed) houses.*

HEAT CONSERVATION IN SMALL HOUSES*

By A. F. DUFTON, M.A., D.I.C., Hon. M.I.H.V.E.

"And with regard to the economy of fuel, it has this in particular to recommend it, that whatever is saved by an individual is at the same time a positive saving to the whole community." — RUMFORD.

Introduction

In its report on *Heating and Ventilation*† the committee under the chairmanship of Sir Alfred Egerton, which was appointed by the Building Research Board to review existing scientific information and practice in this country and abroad on the heating and ventilation of buildings and to make recommendations for practice in post-war building, expressed the opinion that the utmost importance should be attached to the conservation of heat in the building of houses and pointed out that improvements in the insulation of buildings will, in general, reduce both the fuel bill of the occupant, and the amount of coal which has to be mined.

A typical small house was examined by way of example, and a balance arrived at as to the expenditure on insulation, additional to the normal cost of the building, which could justifiably be incurred on account of the saving in the heating cost.

The committee concluded that it would be an economy to require, as maxima, the following values of the heat transmittance coefficient‡ for alternative forms of construction, where such values can generally be easily obtained; and for normal forms of construction where the heating methods installed are controllable; and that still lower values are to be preferred when they can be obtained economically.

External walls :—

(*a*) for any part of the house : 0.20 B.Th.U./sq. ft./hr./deg. F.
(*b*) for the walls of the warmed living room : 0.15 B.Th.U./sq. ft./hr./deg.F.
Ground floor : 0.15 B.Th.U./sq. ft./hr./deg.F.
Roof and top-floor ceiling : 0.20 B.Th.U./sq. ft./hr./deg.F.

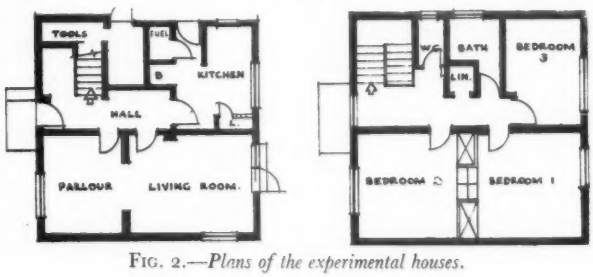


FIG. 2.—*Plans of the experimental houses.*

Eight houses have been built at the Building Research Station for the joint purpose of research in house construction and full-scale tests of the heat requirements of houses insulated to different standards. The objective was to obtain experimental evidence which would help in assessing the amount of insulation which is worth while and to ascertain how the heating of a house insulated to the committee's standard compares with that of an "uninsulated" house.

The recommendations of the committee were conservative and so, in view of the possibility that a higher standard of insulation than that proposed might be envisaged, the houses were designed to provide the four distinct grades of insulation shown in Table I.

TABLE I

THERMAL TRANSMITTANCE. B.TH.U. PER SQ. FT. PER HR. PER DEG. F.

	A	B	C	D
External Walls	0.30	0.25	0.20	1.15
External Walls, Living Room	0.30	0.20	0.15	0.10
Windows	1.0	1.0	1.0	0.5
Windows, Living Room ..	1.0	1.0	0.5	0.5
Ground Floor	0.35	0.20	0.15	0.10
Roof and Top-Floor Ceiling	0.56	0.30	0.20	0.15

Grade A represents the ordinary pre-war house and grade C the standard recommended by the committee.

The heating system installed, one of the various combinations considered for post-war houses, was selected as an experimentally convenient example of an installation using solid fuel: the heating applicances do not need constant attention. Background heating is provided by embedded ceiling panels in the living room and the parlour, which serve also as floor panels for the two main bedrooms; and the living room is "topped-up" by an electric fire. Hot water for the panels is supplied, through a heat-interchanger, by a boiler which also provides the domestic hot water.

† See Appendix.

‡ Post-War Building Studies No. 19. Heating and Ventilation of Dwellings. London. 1945. H.M. Stationery Office. 2s. 6d. net.

Note.—This paper is the full report of the experiment described by Mr. Dufton at the "Fuel and the Future" Conference. See December Journal pp. 69-71.

TABLE II.—CHART SHOWING STRUCTURAL DETAILS OF HOUSES NOS. 2—7

House No.	2	3	4	5	6	7
Insulation Grade	C	A	A	B	D	C
Ground floor	1 in. wood block. Tiles in larder, boiler recess and back lobby	Joists and boards on sleeper walls ventilated	As 3	Quarry tiles in kitchen and hall. 1 in. grano. elsewhere	1 in. cork + 1 in. wood block	As 2
External walls	6 in. Invicta block, rendered externally	4½ in. brick (9 in. round stair opening)	As 3	As 3	As 3	As 2
Lining and finish to external walls of Living Room	Plaster on 1 in. cork	4½ in. brick and plaster	As 3	4 in. foam slag block and plaster	Stud partition faced ⅜ in. plaster board, backed ⅜ in. asbestos cement. Slag wool filling	As 2
Lining and finish to external walls of rooms other	Plaster on ½ in. cork	4½ in. brick and plaster	As 3	3 in. clinker block and plaster	Stud partition faced ⅜ in. plaster board, backed ⅜ in. asbestos cement. Aluminium foil division	As 2
Window glazing	Single except in Living Room where double	Single	Single	Single	Double in all rooms	As 2
Internal partitions. Ground floor	4 in. Invicta plastered. Brick for central wall	4½ in. brick plastered	Central wall, 4½ in. brick, other 3 in. clinker both plastered	As 4	Central wall 4½ in. brick plastered. Other plaster board on stud	As 2
Internal partitions. First floor	4 in. Invicta plastered. Brick for central wall	3 in. clinker except 4½ in. bricks for central wall	As 3	As 3	Central wall 4½ in. brick plastered. Other plaster board on stud	As 2 As 2
First floor construction	6 in. R.C. ¾ in. asphalt	As 2	As 2	As 2	As 2	As 2
Ceiling of Ground Floor	Plastered	As 2	As 2	As 2	As 2	As 2
Roof construction	Felt on 2 in. screed of cement on 5 in. R.C. 1 in. cork lining. Plaster	Felt on cement screed on 5 in. R.C. Plaster	As 3	Felt on 2 in. cement screed on 5 in. R.C. ½ in. fibre board lining, no air space	Felt on cement screed on 3 in. foamed slag on 5 in. R.C. 1 in. cork, plastered	As 2

As calculations indicated that the item for topping-up the living room would exceed that for the whole of the background heating, and for other reasons which need not be detailed, it was decided to include experiments in two more houses§—one grade A and the other grade C—in order to ascertain whether it would be advantageous to eliminate the topping-up and to warm the living room solely by the central heating installation.

THE EXPERIMENTAL HOUSES

Design

The houses used for the experiment are the six flat-roofed houses shown in Fig. 1. They are numbered (left to right in the photograph) from 2 to 7, the houses with pitched roofs being numbers 1 and 8. The six houses have the same general plan (Fig. 2) and their structural details are set out in Table II. A view from the West is shown in Fig. 3.

Heating Equipment

A thermostatically controlled magazine-boiler, suitable for burning anthracite grains, has been installed in the kitchen of each house (Fig. 4). The thermostat brings into operation a fan, located in the tool-shed, which supplies air to the fire and promotes vigorous combustion. When the thermostat switches the fan off, the fire slumbers under the natural draught of the chimney. The boiler heats a hot-water tank in the linen cupboard indirectly and, through a specially designed heat-interchanger‖, which serves as a towel warmer in the bathroom, supplies hot water to invisible ceiling-panels in the living room and in the parlour.

In Houses 2 and 3 the ceiling panels serve to keep the living rooms comfortably warmed and to provide background warmth in the parlour and bedrooms. In the other four houses the panels supply only background heating, and electric fires are provided to supply additional warmth in the living rooms (Fig. 5).

In order to utilise heat which would otherwise be lost, a duct is provided round the boiler flue-pipe and this serves to supply heated air to the landing on the first floor (Fig. 6).

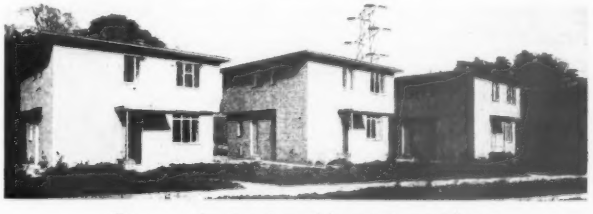


FIG. 3.—*Another view of the experimental houses.*

§ No. 2 and No. 3.

‖ Designed by Messrs. G. N. Haden & Sons, Ltd., to provide water at a temperature suitable for the panels, which are ceiled with plaster.

Provision for Ventilation

Provision for ventilation has been made in accordance with the recommendations of the Egerton Committee. Air is admitted to the living room, the parlour and the three bedrooms from the hall and landing through specially designed louvres above each door (Fig. 7) and is withdrawn from each room by means of a flue. The flue has a cross-sectional area of 30 sq. inches and is suitable for a gas fire.

The main ventilation intake is *via* the tool-shed, whence the air passes through a grille into the hall. Provision for warming the incoming air by means of a radiator was made (Fig. 8) but it was found to be superfluous as the heat from the lower part of the flue, which passes through the tool-shed, proved to be fully sufficient to temper the air.

EXPERIMENTAL ARRANGEMENTS

Eupatheostatic Control

For controlling the warming of the living room of each house a eupatheostat was employed. It will be appreciated that an ordinary room-thermostat is relatively insensitive to the radiant heat from an electric fire and that in comparative experiments it is desirable to be able to control the room to a definite equivalent temperature.

A eupatheostat is an instrument for maintaining a constant equivalent temperature by regulating the warming of a room : it simulates a human being and tries to maintain a comfortable warmth. The instrument is responsive not only to the temperature of the air but also to air movement and to radiation from hot surfaces or to cold surfaces. It is a blackened copper cylinder with a constant heat output (provided electrically) and when set to control at an equivalent temperature of 65 deg. its thermostatic element reduces the supply of heat to the room as soon as the mean temperature of the surface of the cylinder reaches 76.7 deg. F. (*i.e.*, one-third of the way from 65 deg. to 100 deg. F.).

In Houses 2 and 3 the equivalent temperature at the centre of the living room was continuously maintained at 65 deg. F. by a eupatheostat which controlled the flow of hot water through the ceiling panels by means of a motorised valve¶. This valve also controlled the flow to the parlour panels in these houses when they were turned on.

In Houses 4 to 7 the hot-water heating provided only background warmth. An inset electric fire in the living room was used for extra heating and in each house a time-switch turned the fire on between the hours of 7 a.m. and 8.30 a.m. ; noon and 1.30 p.m. ; and 4 p.m., and 10.30 p.m., corresponding to the typical usage suggested by the Egerton Committee. In these houses eupatheostats served to limit the heating of the rooms during these topping-up periods by switching the fires off and on so as to maintain an equivalent temperature of 65 deg. F. when that temperature was attained. The electricity for the fires was metered independently of the other consumption in the houses.

Temperature Measurements

Apart from the eupatheostats in the living rooms, no other room temperature controls were used. A maximum-and-minimum thermometer was hung on the wall of each room, the hall and the landing, with its bulbs 5 ft. from the floor. The location of the thermometer was the same in any room from house to house and was chosen to minimise any effects of radiation on the thermometer. The thermometers were read and reset each morning.

Hot Water Supply

The equivalent of 250 gallons of hot water at 140 deg. F. was drawn off in each house every week. This was done by running up ten baths of approximately 25 gallons each, one every morning and one in the afternoons of Monday, Wednesday and Friday. The temperature of the water was measured on each occasion and, by means of a gauging line figured in degrees Fahrenheit, painted in the bath, the volume drawn off was adjusted so that the heat required to warm that volume from 50 deg. to the observed temperature was equal to the heat required to warm 25 gallons of water from 50 deg. to 140 deg. F.

Cooking Load

Further to simulate conditions in an occupied house, a 1-kW element of an electric cooker was switched on for three periods totalling four hours daily, corresponding to the cooking of breakfast, lunch and an evening meal.

Boilers

The daily fuel consumption of the boilers was determined by weighing. The magazines have wide mouths and so special narrow-mouthed hoppers were inserted so as to make it easy to fill up to a definite level each day.

The only other attention required was the removal of clinker from the fire-beds. This was not a daily operation but was carried out regularly after a hundredweight of fuel had been burned on the cleaned fire-bed.

Control of Background Heating

The experiment commenced with all the panels of each topped-up house turned off. When, as the weather turned cold, the minimum temperature in any of the parlours or two principal bedrooms fell below 50 deg. the panels of that house were put into service by closing a by-pass valve in the linen cupboard.

When the minimum temperature in the rooms rose above 55 deg., as it did when there was a spell of warm weather, the by-pass valve was re-opened until such time as background heat was again required.

In the houses in which the ceiling panels serve to keep the living rooms comfortably warmed, the parlour panel was turned off when the minimum temperature of the parlour or of the bedroom over it exceeded 55 deg. and was turned on again when the minimum temperature in either of the rooms fell below 50 deg. F.

The installations were designed to give substantially equivalent conditions in the various houses, despite the differences in insulation, and were operated to do so as closely as possible, care being taken to ensure that the houses with the higher grades of insulation were no less warm than the less well insulated houses.

EXPERIMENTAL RESULTS

It has been stated that the heating installations were operated to maintain substantially equivalent conditions in the various houses, and that care was taken to ensure that the houses with the higher grades of insulation were no less warm than the less well insulated houses. This equivalence is shown by the average daily minimum temperature for each house (the mean minimum of all the rooms) taken for the period 1 November 1945 to 31 March 1946.

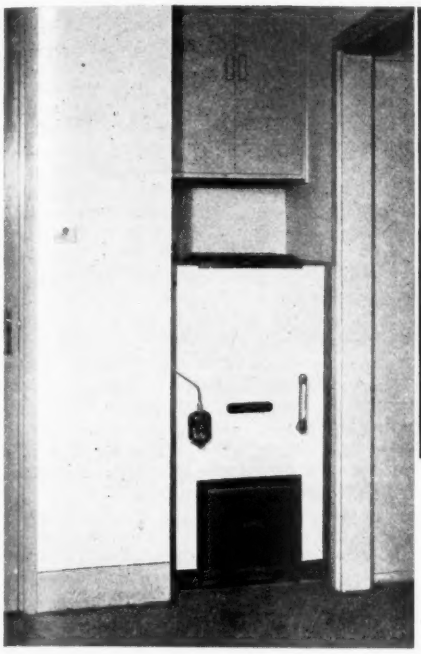
House No.	Insulation Grade	Average Minimum Temperature, °F.
4	A	56
5	B	56
7	C	57
6	D	58
3	A	59
2	C	59

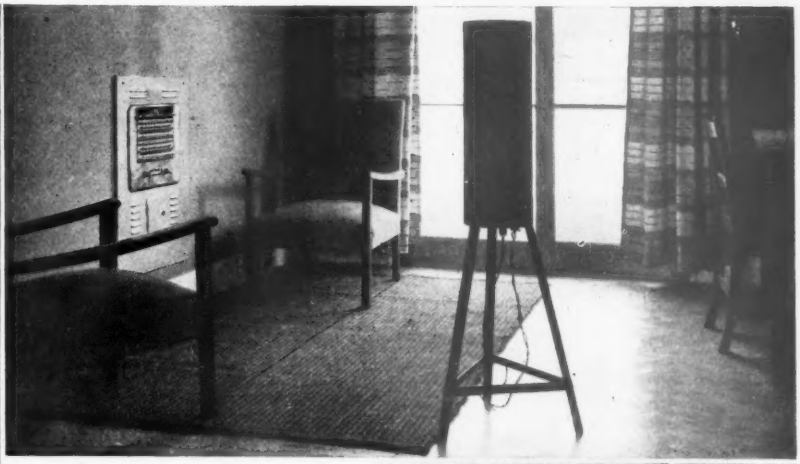
The average mean temperature of each house was approximately one and a half degrees higher than the average minimum temperature. The average daily minimum temperature for each room for the five months is given in Table III (see p. 124).

It will be seen that although the background temperature of House 4, taken as a whole, was comparable with that of Houses 5, 6 and 7, the distribution was such that the minimum temperature of the living room was rather more than 2 deg. F. higher than that which obtained in these other houses.** This meant that the topping-up required was correspondingly less.

¶ In House 3, the installation did not maintain 65 deg. in the coldest weather and, on a day when the outside temperature averaged 26 deg. F., the equivalent temperature in the living room fell to 60 deg. F.

** In providing sufficient background heat upstairs the ceiling panels warm the living room rather more in House 4 than in the other houses ; and the kitchens and bathrooms are warmer in Houses 6 and 7 than in Houses 4 and 5.





Left (FIG. 4).—*Thermostatically controlled magazine boiler. Right* (FIG. 5).—*View of a living-room showing electric fire for topping-up and a cupatheostat in the centre of the room.*

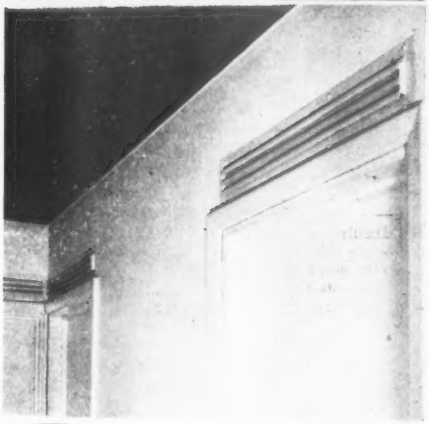


FIG. 7.—*Louvres over doors supply air to the rooms from the hall and landing.*

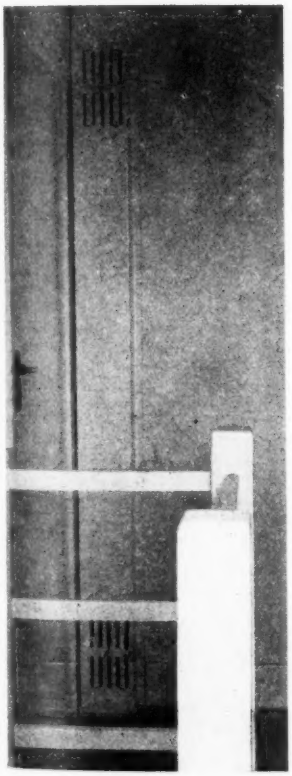


FIG. 6.—*A duct round the boiler flue-pipe supplies heated air to the landing.*

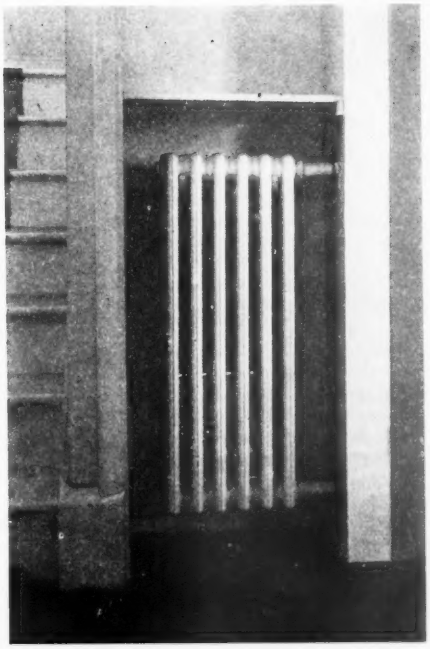


FIG. 8.—*Incoming air via the tool shed is warmed by a radiator in the hall.*

TABLE III
AVERAGE DAILY MINIMUM TEMPERATURES, °F.

House No.	4	5	7	6	3	2
Insulation Grade	A	B	C	D	A	C
Living room	59.1	56.6	56.8	56.6	64.9	65.9
Parlour	55.5	55.5	54.4	53.9	55.6	55.1
Kitchen	59.4	59.4	60.5	61.8	62.0	60.0
Hall	58.7	58.4	57.0	59.5	62.2	59.9
Bathroom	61.1	61.4	65.2	67.1	62.2	64.9
Landing	58.7	59.2	59.7	60.8	62.0	61.7
Bedroom 1	51.6	51.4	51.8	53.6	53.7	54.7
Bedroom 2	52.5	51.4	52.5	54.1	58.0	58.7
Bedroom 3	51.7	51.2	54.0	56.9	53.6	54.1

TABLE IV
WEIGHT OF ANTHRACITE, CWT.

House No.	4	5	7	6	3	2
Insulation Grade	A	B	C	D	A	C
1 November to 31 March	50.2	44.5	37.8	28.8	57.6	43.6
1 October to 31 March	*56.8*	*49.6*	*42.6*	*32.4*	*64.7*	*49.4*

TABLE V
LIVING ROOM TOPPING-UP, kWH

House No.	4	5	7	6
Insulation Grade	A	B	C	D
1 November to 31 March	1,455	1,689	1,576	1,616
1 October to 31 March	*1,607*	*1,924*	*1,754*	*1,822*

TABLE VI
ANTHRACITE FOR HOT WATER SUPPLY, ETC., LB.

House No.	4	5	7	6
Insulation Grade	A	B	C	D
2 April to 15 April	270	272	252	230
Average per day	19	19	18	16

Fuel Consumption

The actual weight of anthracite used in each house during the five months from 1 November to 31 March is set out in Table IV. The table shows also figures for the period of six months, from 1 October to 31 March, which have been derived from this with the aid of data from Houses 1 and 8 which were heated for the full six months—House 1 with background heating and topping-up comparable with Houses 4, 5, 6 and 7 ; and House 8 with the living room kept comfortably warmed and comparable with Houses 2 and 3.

The fuel consumptions for the six winter months are plotted in Figure 9, which illustrates the progressive reduction as the grade of insulation rises from A to D. The grades have been set out so as to give a straight-line graph for background heating. This is convenient as it enables interpolation to be made for grade B, and extrapolation for grade D, on the graph for continuous warming.

Electricity for Topping-Up

The amount of electricity used in each of the four houses 4, 5, 6 and 7 for topping-up the living room during the five months from 1 November to 31 March is set out in Table V, and the table includes figures for the six winter months, October to March, derived from this with the aid of the date from House 1.

The electricity required for topping-up appears to be virtually independent of the grade of insulation provided and the amount is substantially the same in each house—about 1,800 kWh. for each living room for the winter six months. The reason for this is believed to be that the requirement depends more upon the intensity of radiation provided by the fire than upon the increase in the rate of heat loss due to the increased warming of the room. By a horizontal beam of 40 B.Th.U. per sq. ft. per hour the equivalent temperature is raised about 7 deg. F., irrespective of the general warming of the room. House 4 required less than Houses 5, 6 and 7 since, as was pointed out above, the average minimum temperature of its living room was rather more than two degrees higher than that of the living rooms of the other houses.

Fuel Consumption for Hot Water Supply

During the fortnight from 2 April to 15 April, none of the Houses 4, 5, 6 and 7 required any background heating and the fuel consumed provided the hot water supply—the equivalent of 250 gallons at 140 deg. F. each week—and warmth for the linen cupboard and for towel warming in the bathroom. An average of 18 lb. of anthracite per day was found to be required: the actual quantities are set out in Table VI.

Boiler Efficiencies

Tests were made, with the co-operation of the Director of Fuel Research, to determine the efficiencies of the boilers, upon the basis that the whole of the potential heat input to the appliance is efficiently used, with the exception of the potential and sensible heat carried away in the flue gases leaving the terminal and any potential heat loss due to incompletely burnt residue.

It was found that the six boilers do not differ significantly from one appliance to another ; that the efficiency is about 78 per cent. under natural draught rising to about 83 per cent. with the blower in operation ; and that the mean efficiency of the boilers, taking all the results irrespective of load, is 80 per cent.

DISCUSSION OF RESULTS

Saving of Fuel due to Insulation

In presenting the details of the electricity required for topping-up the living rooms in the background-heated houses, in Table V, it was pointed out that for all intents and purposes, the amount was independent of the grade of insulation of the various houses. This means that the saving of fuel due to insulation can be appraised in terms of the fuel required to provide the background warmth and the hot water supply, figures for which were set out in Table IV.

With grade A, the pre-war standard, as datum, the savings found for grades B, C and D in the experiments in Houses 4, 5, 6 and 7 are as shown in the following table, which lists both the annual saving of fuel and also its monetary value, reckoned at £4 4s. per ton.

Grade of Insulation	Saving of Fuel	Monetary Value
	cwt.	£ s. d.
B	7.2	1 10 3
C	14.4	3 0 6
D	24.2	5 1 8

The saving found for grade C, from experiments in Houses 2 and 3, in which the living rooms were kept comfortably warmed, amounted to 15.3 cwt., valued at £3 4s. 3d.

On these fuel savings one could justify an additional initial cost of £60 of a grade-C house over a grade-A house, the figure underlying the suggested maximum values of thermal transmittance put forward by the Egerton Committee.

Topping-up

As mentioned in the introduction to this report, two houses, one grade A and the other grade C, were duplicated in order to ascertain whether it would be advantageous to eliminate the topping-up and to warm the living-room solely by the central heating installation.

It will be seen from Table IV that, in the six winter months, the boiler of a grade-A house consumes 7.9 cwt. more fuel, and the boiler of a grade-C house 6.8 cwt., if it provides heat to keep the living room comfortably warmed at all times. This extra fuel has to be set against the 1,800 kWh. required for the six-months topping-up of a living room (cf. Table V).

Now, as £1 17s. 6d. will purchase either 1,800 units of electricity at 0¼d. per unit or 9 cwt. of anthracite grains at £4 4s. per ton, it is clear that it is advantageous to eliminate the topping-up and to warm the living room solely by the central heating installation unless electricity can be obtained for a farthing a unit. And even so the warmth provided by the electric fire is less generous and less equable than that afforded by the central heating installation. In a house with a less efficient central heating installation, a proportionately higher price for electricity would naturally be considered as justifiable.

Hot Water Supply

The hot-water tank in the linen cupboard is nominally insulated in accordance with the suggestions in the Report of the Egerton Committee, that is with the equivalent of 1¼ in. magnesia-type covering. That the insulation provided is not up to specification will be clear, however, from Figure 10; the measured heat loss, with water at 140 deg. F., was as much as 230,000 B.Th.U. per week, a figure which may be compared with the 340,000 B.Th.U. per week, on p. 40 of the Committee's Report, for an uninsulated tank, and the 95,000 B.Th.U. per week for a well-insulated tank.††

On the average, in mild weather when background heating was not required, the weekly consumption to provide hot water and to warm the bathroom (the bathrooms were unduly hot) amounted to 128 lb. of anthracite (c.f. Tables III and VI). It would seem that there is much scope for the saving of fuel in the careful design of a hot-water system just as there is in conserving heat by insulating a small house.

Economical Utilization of Fuel

On p. 69 of the Egerton Report, the following estimate is given of the fuel consumption for a house at Kew of "medium" insulation (intermediate between grade A and grade C, and substantially equivalent to grade B) of floor area 768 sq. ft., the centre house of a terrace :—

Service	Appliances	Annual fuel consumption
Background heating, all rooms except bathroom	Central heating (embedded panels) from hot-water boiler	44 –76 cwt.
Topping-up, living room	Electric fire	1975 kWh.
Topping-up, bedrooms	Not required	—
Hot-water supply, includes bathroom heating	Hot-water boiler	48—71 cwt.
Cooking	Electric cooker	1456 kWh.

It is of interest to compare these figures with the values obtained in the present experiments in Houses 5, 4 and 3, detached houses, of floor area 1,050 sq. ft., heated by a similar combination of appliances.

†† In view of this discrepancy a portion of the insulation has been removed for examination : it is a quilt of hessian padded with asbestos fibre and has an average overall thickness of half an inch.

TABLE VII
COMPARISON OF FUEL CONSUMPTIONS

Service	Appliances	Fuel consumption for 6 winter months			
		768 sq. ft. terrace house in Egerton Report	1,050 sq. ft. detached house		
			Grade B	Grade A	Grade A
Heating and hot-water supply	Central heating (embedded panels) and hot-water boiler	68-112 cwt.	49.6 cwt.	56.8 cwt.	64.7 cwt.
Topping-up, living room	Electric fire	1,550 kWh.	1,924 kWh.	1,607 kWh.	Nil

The range of values given in the Egerton Report for the solid fuel requirement corresponds to various assumed boiler efficiences and even the maximum appliance efficiency assumed is below that obtained from the boiler installed in the present houses.

The comparison, which is conveniently made on the basis of the fuel consumption for the six winter months, from 1 October to 31 March, is set out in Table VII. The average outside temperature for the period was 42.9 deg. F., substantially equal to 42.6 deg. F., the normal figure for Kew.

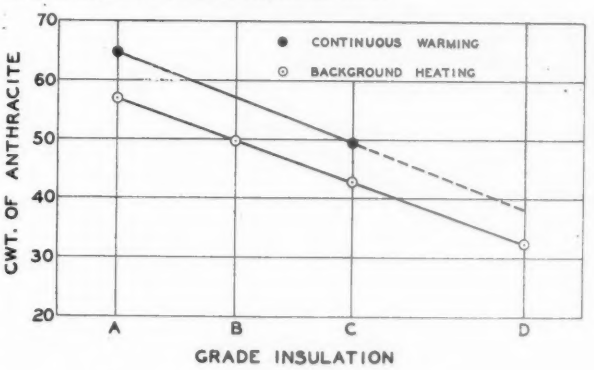


FIG. 9.—*Fuel Consumption for six winter months.*

When it is remembered that the average daily *minimum* temperatures in the relatively large, detached, experimental houses were as high as 56 deg., 56 deg. and 59 deg. respectively, it is clear that the comparison reveals that an important further saving of fuel, over and above that estimated in the Egerton Report, can be obtained. And the figures in the last two columns refer to "uninsulated" houses.

It is practicable, with less fuel than that estimated by the committee for a terrace house, to heat to an even higher degree a larger, detached, uninsulated house.

CONCLUSIONS

The experiments which have been carried out in six small houses confirm the view of the Egerton Committee that an expenditure on insulation can justifiably be incurred, additional to the normal cost of building, on account of the substantial saving in the heating cost. They confirm that, if the additional initial cost does not exceed £60 for a small house the maximum values of thermal conductance put forward by the Committee are reasonable, and that still lower values are to be preferred where they can be obtained economically.

The *dictum* of the Committee, that those responsible for the choice of methods of heating of new houses need to make a careful study of the relative costs of the various systems available

in any district, is lent added emphasis by the investigation into the alternative of eliminating topping-up by an electric fire and of warming the living room solely by the central heating installation.

The experiments show that it is practicable to heat a house with an economy of fuel even greater than is apparent in the Egerton Report. It is hoped that this demonstration will lead to increased economy and efficiency for the individual user and to a more economical utilisation of the national fuel resources.

ACKNOWLEDGMENT

The work described in this paper has been carried out as part of the programme of the Building Research Board, and the paper is published by permission of the Director of Building Research, Department of Scientific and Industrial Research, Building Research Station, Garston, Herts.

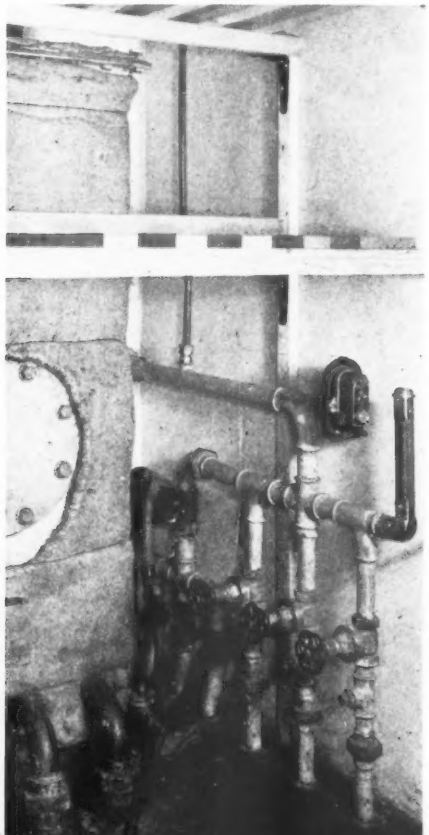


FIG. 10.—*Hot-water tank.*

APPENDIX

HEAT TRANSMISSION

(abridged from Fuel Efficiency Bulletin No. 12)

1. DEFINITIONS.—The following quantities are used in calculating the heat transmission through a structure.

(*a*) The British Thermal Unit (B.Th.U.) is the amount of heat absorbed by 1 lb. of water when its temperature is raised by one degree Fahrenheit.

(*b*) The conductivity k of a material is a characteristic of the material, and is the amount of heat transmitted per hour through a sq. ft of the material, 1 in. in thickness, when the surface temperatures on the opposite sides differ by 1 deg. F. This is usually abbreviated to read :—

k = B.Th.U./sq. ft./hr./°F./in. (*Note :* Resistivity = $1/k$).

TABLE 1.—CONDUCTIVITY OF STRUCTURAL AND INSULATING MATERIALS

	Conductivity k B.Th.U./sq. ft./hr./°F./in.	Resistivity $1/k$
Cork (slab) (according to density)	0.29—0.43	3.45—2.33
Fibreboard	0.35	2.86
Asbestos insulating slab	0.33—0.37	3.07—2.70
Laminated wallboard	0.53	1.80
Wood wool cement slab	0.58	1.72
Hardboard	0.71	1.41
Plasterboard	1.10	0.91
Asbestos cement sheet	1.90	0.53
Asbestos millboard	1.92	0.52
Glass fibre (glass silk)	0.28	3.57
Slag wool	0.30	3.33
Eel grass quilt	0.31	3.22
Asbestos fibre (felted)	054	1.85
Sawdust	0..41	2.44
Plaster	4.0	0.25
Brickwork	8.0	0.125
Ballast concrete	7.0	0.14
Lightweight concrete	1.9	0.53
Air space (minimum ¾ in.). Resistance may be taken as 1.0.		
Air space formed between corrugated material and lining in contact therewith. Resistance may be taken as 0.5.		
Air space (minimum ¾ in.) formed between corrugated material and lining. Resistance may be taken as 0.0.		

TABLE 2.—SURFACE RESISTANCES

	Resistance
Roofs—	
External surface (corrugated)	0.20
„ „ (plane)	0.25
Internal surface (corrugated)	0.48
„ „ (plane)	0.60
Walls—	
External surface (corrugated)	0.24
„ „ (plane)	0.30
Internal surface (corrugated)	0.56
„ „ (plane)	0.70

(*c*) The surface-to-surface conductance C of a material or construction is the number of B.Th.U. transmitted per hour through a sq. ft. of the material or construction when the surface temperatures on the opposite sides differ by 1 deg. F. This is usually abbreviated to read :—

C = B.Th.U./sq. ft./hr./°F. difference of surface temperature.

From the definition of conductivity it follows that the surface-to-surface conductance of a homogeneous material of thickness L is $C = k/L$.

(*d*) The surface-to-surface resistance is the reciprocal of the surface-to-surface conductance. It is thus $1/C$; and for a homogeneous material, it becomes L/k.

(*e*) The surface resistance R_s is the number of hours required for the transmission of 1 B.Th.U. from the neighbouring air to 1 sq. ft. of surface (or *vice versa*) when there is a temperature difference of 1 deg. F. between the surface and the air.

(*f*) The thermal transmittance U is the number of B.Th.U. transmitted per hour through a sq. ft. of the construction when a temperature difference of 1 deg. F. exists between the air on the two sides of the construction. This is usually abbreviated to read :—

U = B.Th.U./sq. ft./hr./°F. difference of air temperature.

(*g*) The air-to-air resistance R is the reciprocal of the thermal transmittance. Thus $R = 1/U$.

It will be noted that the air-to-air resistance includes the effect of the surfaces, whereas the surface-to-surface resistance does not.

2. CALCULATION OF THERMAL TRANSMITTANCE OF A STRUCTURE

In order to calculate the thermal transmittance of a composite construction, it is necessary first of all to calculate the thermal resistance of each of its component parts. From the definition, the surface-to-surface resistance of any component is L/k, where k is the conductivity of the material, and L its thickness. The surface-to-surface resistance

of a number of layers of different materials is the sum of the resistances of the component layers.

The total air-to-air resistance of a structure consisting of a single component is then the sum of the surface-to-surface resistance of the material, *plus* the resistance of the internal surface, *plus* the resistance of the external surface; and in the case of a composite structure, the air-to-air resistance is the sum of the surface-to-surface resistances of the component parts, *plus* the surface resistances as before.

The resistance of any air space formed in the construction must also be included.

The thermal transmittance U is the reciprocal of the total resistance. From the above it will be seen that the resistance of a structure is given by the formula :—

$$R = R_{si} + R_{so} + L_1/k_1 + L_2/k_2 + \ldots + R_a$$

and

$$U = 1/R$$

In these formulæ—

R_{si} is the resistance of the internal surface.
R_{so} is the resistance of the external surface.
L_1, L_2, etc., the thickness in inches of the layers of individual material considered.
k_1, k_2, etc., the conductivity of the individual materials.
R_a resistance of an air-space, where incorporated in the structure considered.

The method of calculation is illustrated by the following examples :—

(i) 11-in. cavity brick wall :—

	Thickness of material L.	Conductivity k.	Resistance
External surface (plane)	—	—	0.30
4½ in. brick	4½ in.	8.0	$\frac{(4\frac{1}{2})}{8.0} = 0.56$
Air space (minimum ¾ in.)	—	—	1.00
4½ in. brick	4½ in.	8.0	$\frac{(4\frac{1}{2})}{8.0} = 0.56$
Plaster	¾ in.	4.0	$\frac{(\frac{3}{4})}{4} = 0.19$
Internal surface (plane)	—	—	0.70
Total resistance			3.31

$$\therefore U = \frac{1}{R} = \frac{1}{3.31} = 0.30$$

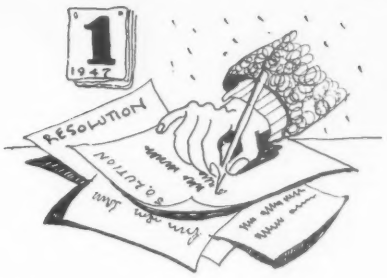
(ii) Corrugated iron roof, lined with ½-in. fibreboard, to form air space :—

	Thickness of material L.	Conductivity k.	Resistance
External surface (corrugated)	—	—	0.20
Corrugated iron	Resistance can be neglected		0.00
Air space between corrugated material and insulation (minimum ¾ in.)	—	—	0.90
Fibreboard	½ in.	0.35	$\frac{(\frac{1}{2})}{0.35} = 1.43$
Internal surface (plane)	—	—	0.60
Total resistance			3.13

$$\therefore U = \frac{1}{R} = \frac{1}{3.13} = 0.32$$

Values of the conductivity of various insulating materials are given in Table 1 and values of surface resistances in Table 2. A more complete list of conductivities and transmittances is given in a booklet published by the Institution of Heating and Ventilating Engineers, entitled "The Computation of the Heat Requirements of Buildings." (Obtainable from the I.H.V.E., 72 Victoria Street, S.W.1. Price 2s.). This publication gives the values which should be used in cases of abnormal exposure, etc.

SCHOOLS AND STUDENTS



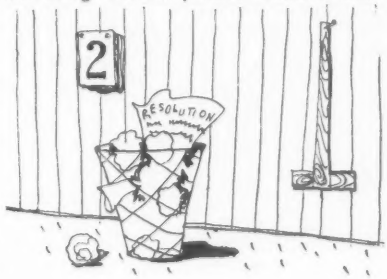
THE STUFF OUR DREAMS ARE MADE OF

The following is from a recent talk to a students' society by Mr. L. Sylvester Sullivan [F.].

These are no winged words of gold, nor elixir that will magically turn us into Christopher Wrens. There are no short cuts in architecture, but only strait and narrow paths of work and study—study and work. Reach-me-downs and ready-mades are not for us. There is nothing in true architecture that can be unmeasured or shamefacedly hooked from a peg. If there were, architects might become an unnecessary redundance. So far prefabrication seems to avoid all grace.

It is to our good that every job that comes has something about it that needs the bringing of thought to bear upon it. Everything we do calls for specialised thought, no matter how small the thing may be. We ponder fitness and purpose; it is the study put into it that gives the soul what every well designed object should have—the soul that lives on to witness to the nature that was ours. Thought and foresight are economical things whichever way we look at it. Many a building has been ruined for the want of a little more of them—many a building survives because of the little more that has given some touch of dignity or beauty that has endured, and by the endurance has commemorated its creator. It does not matter what the work is, be it church, office or plain factory—castle or cottage. The gift of thought to the small thing may give it more beauty than the great cathedral, which may have been designed with the tongue in the cheek or in arrogance. Our dreams may be gossamer, even valiant, but never arrogant.

Some of the great buildings of the world—Versailles for instance—that have been designed with every attribute of pomp and circumstance somehow leave one cold and unsatisfied. It may be something lacking in us—it is to be hoped not, for our understanding is, or should be, all-embracing. It is probable that we have grown out of the attitude of mind that desires or tolerates such pomp. It may be a good thing that as life becomes more complicated and mechanised the soul of man should become more simple and slough off the youthful skins of satisfaction and pride. This is really saying something of the way in which to approach our work. The opportunity only comes to few to be masterly. Humility, rather than masterfulness, is the state of mind that expresses it better. If we approach every



work we have to do with humility, without self-satisfaction and without pride, determining to produce only the best that is in us, and to think and think again, to scrap and rescrap, we shall develop in ourselves a pertinacity for the best that, while putting us above a desire for fashion, will give an originality to the work we do. So we may succeed in getting our dreams down to terms of pencil and paper—however smudgy and inadequate.

We must do our thinking for ourselves, being satisfied with no ready-made shibboleths, trying to purify our architectural ideals. We cannot stop thinking when the day is over. Spoon-feeding enlarges the crop and clogs the mind. Appreciation should be alert for proportion, seemliness and beauty. There is a lot of jargon talked by those to whom words mean more than the job. To us the job is the thing—we live with it, and sweat and fume and spend ourselves, giving ourselves to the uttermost. Words and poppy-cock pass us by—we do not hear, being engrossed in our effort and prayer for the job. Besides, the gibberish of the Building Acts is enough for us and controls us in ways unthought of by the talkers. We let the jargon go and learn more by poring over working drawings.

It is noticeable that great artists talk little—the greater the artist the less the noise. In a moving crowd the obvious man is the still one. When everyone is chattering it is the quiet person that attracts attention. Why, do you suppose, this is? Is it because when man thinks he is still, and that when he is silent he is ruminating? A seemingly solemn person may have a mind that is a whirling gaiety within, or, maybe, he is creating domes of almost unimaginable beauty. If glumness arises from mere numbness of mind man is to be pitied. Similarly if we can get dignity, repose and quietness into our building we will have gone a long way.

Most, if not all of us, go through a period of copying genius we admire. There is no particular harm in this if we do not allow it to become a habit. We learn by such things if we remember that copying is only a stepping-stone to the development of our own individuality and solus. We may follow a mode, or pinch an idea, but what good is that if we miss the soul that has gone into the making of the good in the thing we steal. It is only we who can create the soul in our buildings for ourselves. If we are soulless—then so will our work be without soul. There is no recipe for getting this into the work—it gets there or it does not. It is an unconscious thing. The taking of pains may give it; the personal effort and care that study and thought calls for may get some of the spirit that is in us into the job we do—a concentration for the best striven for again and again. If the spirit is graceful then the building may have grace. If it be vulgar then the building, most assuredly, will be vulgar too. It seems then that the higher and purer the thought the greater the discard of vulgarity will be, and so much more chance of star-dust illuminating our names (if names matter) after we are gone.

One of the best lessons ever given was in the ruthless use of india-rubber, which, in effect, was a somewhat curt way of saying, "Think again." Looked at rightly ours is not a job we can drop when the clock strikes six. We carry it in our minds all our waking hours, and return to it again in the pauses of our sleep lest we be unready when illumination comes. It becomes a part of us, a nature, a corrugation in the brain—and we enjoy it, however much pain and disappointment is suffered in the process. This is to speak as a designer—a working designer who rubs out his own blots, corrects his own errors, and strives after better and yet better afterthoughts. It is only another way of saying that knowledge is never perfected, nor learning complete; life would be unbearable if it were not so—for after a while there would be nothing left to attain. It would be horrible if, on reaching a certain stage, there were nothing left to strive for. How flat life would be—too old at forty would be a reality with declension as aftermath, and architecture a nightmare of perfected sameness—the Ideal Home attained and repeated *ad nauseam*, more dreamful than a jerry-builder's dream, which, at least, might not be priggish.

I was asked recently by a very young man what it feels like to see one's building finished, in the first flush of its undraping as it were. Well, there is a mixture of feelings. One stands in the shelter of some doorway opposite with the Clerk of Works, who has had the scaffolding removed, and who, one notices, is looking at one rather quizzically. The job is done, finished; there it is unalterable. One cannot change one's mind or rub out the blots. There it is—real—the Portland-stone gleaming in the sunshine; what do you think—what are you to think? You listen for comments from the passers-by. But the man in the street says nothing—he is disappointingly unobservant and silent. As for yourself you have been living with it so long and hoping for it so much that it is out of perspective and you are unable to attach any values. You wonder what values the critics will give it, if they give it any values at all. Perhaps they will talk about functionalism or unresolved duality. Almost certainly their criticisms will not square with the Building Acts with which they seem to have nothing to do. While there stands the building, steel-framed and enduring and likely to see designer and critic alike into the grave and still go on enduring and uncaring; then you feel that the critics do not matter a maravedi. The critic that matters is yourself. You alone know if you have done your best. Perhaps some years hence you may come on your building unexpectedly and see it in its proper light and perspective. Then you will know. Meanwhile your building is complete—there is little left to do but the accounts. Soon people managing your building will not know you and you go into it as an interloper and have to explain who you are, for you are a stranger within. Someone has struck matches on the walls and written things in the lavatories—and you are hurt. That is what I think one feels—but the predominating feeling is loss—it has gone from you, finished and you will know it no more.

But a dream has come true.

Bristol Centre Arch. S.A.

Bristol is the first Centre of Arch. S.A. to complete discussion of the R.I.B.A. report on Architectural Education, which they approve with few exceptions. Their unanimous acceptance of by far the greater part of what our elders and betters have decided to be good for us is encouraging. It seems to show that students are not, as some people suppose, merely trying to be awkward. Bristol students find fault with two points only of the report. They consider that sufficient attention is already paid to domestic work in their curriculum, if not in others, and they do not agree with the Committee's suggestion that recruitment to the profession should be regulated to avoid any deficiency or surplus of architects. In this last they agree with the views of the R.I.B.A. Council, who rejected the relevant recommendation of the Royal Institute Special Committee. Bristol students feel that the report could have paid more attention to the study of sociology.

Liverpool

A lecture on "Some Formal Aspects of Twentieth Century Painting" was given by Mr. Bisson of the Sandon Studios; Mr. Charles Wheeler, R.A., speaking on "Architectural Sculpture" deplored the lack of it in modern architecture. An exhibition of the work of students opened at the Bluecoat Chambers on the 1 December, while another exhibition of American Georgian work has been on view at the School of Architecture.

New Appointments of Arch. S.A. Officers

The following have been elected:—

At Leeds. President: Henry Bartoft (ex-service).
Secretary: Miss K. Kershaw.
Treasurer: Philip Cranswick (ex-service).

At Manchester University. Chairman: D. M. S. Pearse.
Secretaries: D. G. Elsey. T. A. Marcus.
Treasurer: L. E. Sykes.

Travel

The Arch. S.A. Travel Secretary has arranged for a small party of students from the Regent Street Polytechnic, Bartlett and Liverpool schools to visit Italy. They will leave on 29 April on a four weeks' trip to Rome via Dieppe, Paris, Basle, Zürich, Venice and Florence, staying at Youth Hostels.

CZECHOSLOVAK ARCHITECTURE PAST AND PRESENT

By

Jaromir Krejcar, Czechoslovak Architect

Czech architecture has an old and good tradition. The oldest architectural monuments date from Romanesque times and are closely linked with the historic events of our nation. The Gothic period brought a great development to Czech architecture and left us a number of beautiful cathedrals and churches as well as civic buildings. Linked with the Gothic period was also a general political progress of the Czech nation. Prague, the capital of Czechoslovakia, is a real gem of Gothic architecture and art. This period created a town which according to Humbold was one of the most beautiful towns in the world.

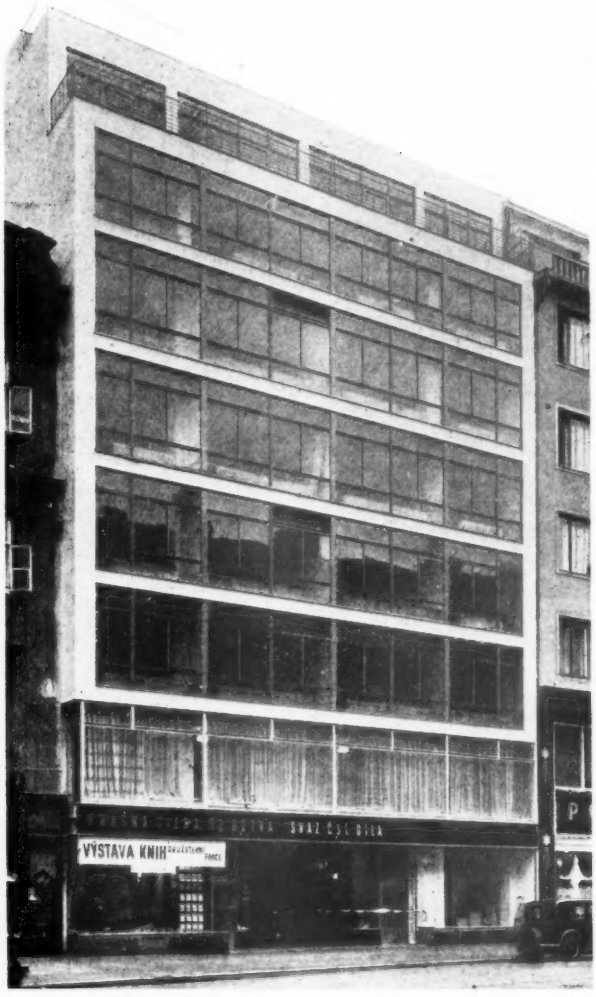
Prague Gothic architecture—with a Baroque spire. The Cathedral.

Typical Prague Baroque architecture. The Church of St. Nicolaus.

The Renaissance, following this period, does not appear to have been so close to the soul of the Czech people as the Gothic period was; in fact it was somewhat remote. One of the main reasons for this was the strong foreign influence in culture and politics that permeated the country at that time. Even so, this period left us a legacy of many an outstanding building. Unlike the Gothic period, when most buildings were inspired by Czech builders, the Renaissance buildings show the influence of Italian builders and artists, who were brought into the country by the Hapsburg dynasty. The ruling class of that time built for themselves splendid palaces.

In the ensuing Baroque period, however, the creative spirit of the Czechs rose again to new heights. Apart from Gothic, Baroque represents the most famous period of Czech architecture. These two entirely different styles have left their imprint on Prague architecture. Whole Baroque quarters grew up round the mediæval Gothic centre of Prague and merged it into a picturesque town.

The second half of the nineteenth century witnessed a decline of architecture not only in Bohemia but practically everywhere where the industrial revolution set in. It was the time of growing industrial capitalism, which has left its sordid legacy of slums. This period had a damaging effect upon the architectural quality of Prague. Not only were indifferent and poor buildings put up all over the place without any plan whatsoever, but architecturally valuable old buildings were destroyed. Factories were erected next to houses, open spaces were built up, and the only consideration was the financial exploitation of the building plots.



Co-operative store in Prague by Professor O. Starý. 1935.

With the beginning of the twentieth century, voices were raised against the ruthless destruction of the ancient quarters, and the importance of the historic legacy of the town began to be appreciated. Public opinion forced owners of historically important buildings to maintain them properly. At the same time the foundations were laid for a new architectural expression. This, of course, is only a very sketchy survey of the historic development of our architectural tradition in order to give at least the background against which contemporary Czechoslovak architecture is to be seen.

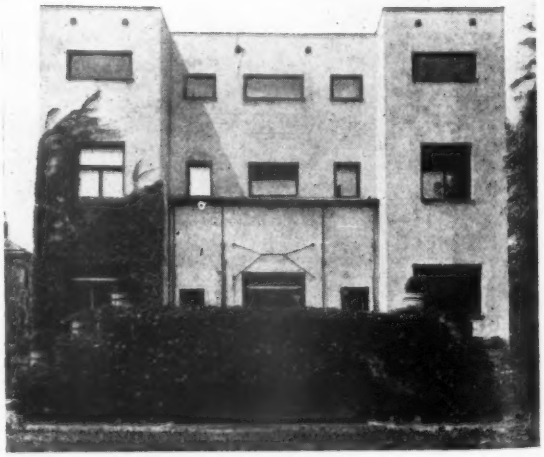
The short period before the first great war manifested itself in a strong reaction of Czech architecture against the romanticism which then prevailed. A new way of expression was being sought, one which would correspond with the new age. The democratic tradition of the Czech people could not find an answer to pressing social problems in romantic apeing of the past, but looked for more logical solutions. The social progress to which they aspired was naturally expressed in their contemporary architecture.

After the first world war we witnessed a ripening of these new ideas into definite principles of the new architecture. At first the examples of Corbusier and of modern Dutch architects like Oud influenced architecture in Czechoslovakia. One of the most outstanding figures of Czech architecture of that time was Adolf Loos, who fought both against meaningless ornament and the escapist attitude of art for art's sake. He defined the function of architecture as a vehicle for providing man with happy surroundings rather than making it a purely artistic expression with little or no regard to the human being. He was a great admirer of the English house as it had developed throughout the centuries and he held it out as an example for solutions of contemporary housing problems.

As in England, the part which the architect played in the post-war building boom, was relatively insignificant as compared with the vast amount of speculative building carried out indiscriminately by building firms who were more interested in profit than in carefully thought-out planning. This was mainly due to the fact that there was no restriction whatsoever on private enterprise in building. In spite of this, contemporary Czech architects succeeded step by step, by mobilising public opinion, in hammering out the principles of a new architecture which would correspond to the real needs of the people. The main activity of these architects was confined to propagating new ideas, and only sometimes did they succeed in getting them materialised. Of course, the best propagation of this new approach would have been the erection of buildings rather than theoretical articles, because a really good contemporary building would have spoken for itself. The general public, who are the consumers, should be able to see for themselves that modern architecture is not a luxury for the rich, but provides both economic and efficient living conditions for everybody.

Many of our big building firms took the initiative and consulted architects, though they were under no obligation to do so. They found that it paid them in the end to co-operate with architects and they ceased to look upon the architect's work as being an eccentric expression of modern art.

At this point Czech architects parted and went in two different directions. One school of thought was content with the realisation of new buildings in a contemporary manner meeting the demands of well-to-do individuals. They did not pay much attention to the potentialities and social implications which

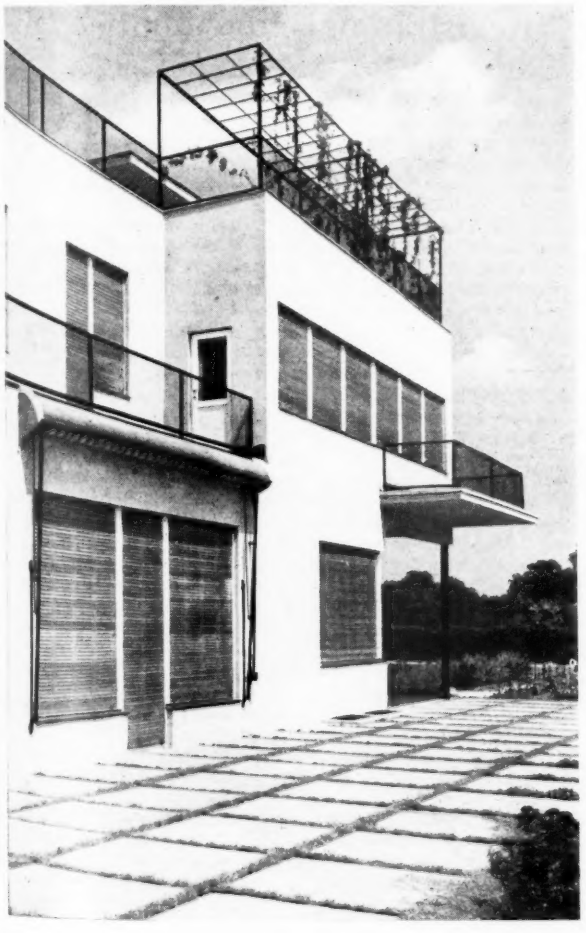


An early example of modern architecture. A house built in Vienna by Adolf Loos in 1910.

would open up, if architecture were based more logically on industrial mass-production. The other school of thought, on the other hand, was fully conscious of these possibilities and the way in which they could influence building in general and housing in particular.

I believe the historic contribution of modern architecture to lie not only in the utilisation of elements of mass-production in a technical way, but in their use and combination for a new æsthetic expression of our age. It is for the first time in history that architecture can provide not only for the fulfilment of technical and æsthetic demands of a few privileged persons, but for all people, provided that full use is made of the machine and mass-production.

Given these conditions, it is obvious that we have now the material possibilities to rehouse millions of people in decent, healthy and at the same time beautiful houses—for the machine is well able to create beauty if properly handled. The objections to the full use of mechanisation in modern architecture as being detrimental to its artistic expression, are, to my mind, out of place. Of course, we must realise that all the new materials we have at our disposal to-day are but the raw material. It is up to our creative spirit to combine and form these into new and beautiful works of art. Just as the Gothic builder shaped the stones and mortar at his disposal into glorious cathedrals, because he imbued them with his fervent belief in God and man, so can we utilise the far more superior materials available to-day for our new social ideas of providing the people with such physical



Two views of a house in Prague, built in 1927 by Jaromír Krejcar, the author of this article.

conditions as will make for a full and happy life. I believe that modern architecture that will express this social content will be just as beautiful in its own way as are the cathedrals we so much admire to-day.

Czechoslovakia, like all countries which were liberated from German occupation, has been going through national and social changes as never before in her history. Most of our heavy and key industries have been in German hands during the occupation. When liberation came, industry was naturally taken over by the State. Side by side with this nationalised industry a certain amount of private ownership continues to operate as it is not our intention to nationalise more industries and private concerns than is really necessary for the sake of efficiency and prosperity.

The reorganisation of this German-owned industry, which served almost exclusively for war production, into an industry owned by the nation and working for peace and for the people, is naturally a difficult and intricate problem. Modern industry necessitates the integration of one branch of production with many others, and a smoothly working co-operation between them. Modern building is, as I have mentioned before, closely linked with industrial production, in fact is pre-conditioned by it. It is therefore only logical that the building industry forms an integral part of the new two-year programme for the reconstruction of our country, a programme which incidentally had been agreed upon by all four political parties represented in the Government.

Included in this two-year plan will be first and foremost the building of houses and flats which will, at least to a certain degree, alleviate the present grave housing shortage. Side by side with this we plan to expand our industry which will at the same time aid our housing drive. Cultural and utilitarian buildings like hospitals and schools will naturally be included. Every town and village will prepare a development scheme, similar to the preparation of planning schemes by local authorities in England.

The great majority of the Czechs and Slovaks believe that we cannot afford any other method but proper planning if we want to carry out our programme successfully. There are, of course, some people who maintain that this planning will stifle private initiative and they would rather revert to the 1939 conditions

of laissez-faire. I think I speak for the great majority of architects and planners when I say that such a policy would lead to chaos and we would never be able to recover from the wounds which the country has suffered. I have mentioned only the building side of the two-year plan which naturally deals with practically all our production activities. It is our intention not only to reach our 1939 standard of living, but to lay the foundations for a development far beyond it.

I should now like to discuss one or two examples of our post-war planning. One of these plans deals with the synthetic petrol plant in the north of Bohemia. Here we are attempting to solve the problem of housing the miners, who, under the Germans had to live in camps. Altogether some 35,000 people will be accommodated here. The plan is divided into two stages of which only the first has yet been worked out. It provides for both cottages and blocks of flats. It is our intention to leave it to the people to decide after this, whether we should then plan for more cottages or flats, or for both. We want to let the actual buildings speak for themselves. I personally think that a well-planned block of flats can provide more efficiency and comfort than the small house, and be more economical.

The second example I should like to mention is the series of plans in connection with the rebuilding of Lidice. This mining village was, as you all know, completely destroyed by the Germans. A national competition was held and resulted in a number of solutions for the rebuilding of Lidice. A collective of architects who had been awarded first premiums was formed and they are now working out the final plans. They have agreed that the site of the original village shall be preserved as a place of national pilgrimage. This village plan is to be surrounded by a belt of yew trees. The new Lidice is planned about half a mile from the original site and will house 1,000 miners working nearby. One of the focal points in this new Lidice will be the British-Czechoslovak Research Station for the safety of mining. The new village will be organised on a co-operative basis, while individual farming methods will be maintained. This individual farming will be supplemented by a large co-operative farm, the modern agricultural machinery of which will be at the disposal of the farming community.

It is with deep gratitude that I recall the unprecedented generosity and sympathy with which the British public, and specially the British miners, contributed both materially and morally to the rebuilding of Lidice. It may please you to hear that the news of the "Lidice Shall Live" Movement was one of the greatest moral supports for us in what was probably the darkest hour in our national history. We therefore look at the reconstruction of Lidice not only as a rebuilding of a destroyed village, but "Lidice Shall Live" as a symbol of friendship between the British and the Czechoslovak people.

ARCHITECTS AND QUANTITY SURVEYORS

Memorandum by the Architects' Registration Council of the United Kingdom

1. Some misapprehension exists as to the line of demarcation to be drawn between the duties and responsibilities respectively of Architects and Quantity Surveyors. This misapprehension extends also to the manner in which the payment of fees to the latter should be made. Indeed, from the representations made to the Architects' Registration Council it would appear that the practice prevails in some parts of the country under which Architects share fees charged by Quantity Surveyors.

2. It is therefore to remove any possible misunderstanding on these matters that the following observations are submitted for information and guidance.

3. The functions of an Architect and those of a Quantity Surveyor, whilst they may be regarded in a sense as complementary, are quite separate and distinct in performance.

4. The Architect's duty is to prepare all the drawings, details and specifications sufficient to present to the Quantity Surveyor a complete picture of the work to be executed.

5. For these services the Architect is remunerated by fees based upon the Scale of Charges published by the Royal Institute of British Architects or the other constituent bodies referred to in the First Schedule of the Architects' (Registration) Act 1931.

6. The Quantity Surveyor's duty is to prepare the Bills of Quantities from the drawings, details and specifications so prepared by the Architect and supplied to him for the purpose, so that the builder in his turn may know, before submitting a tender, precisely the nature and extent of the project and the full measure of his liabilities under the contract, and so as to ensure a common basis of tender.

7. For this service the scales of charges laid down by the professional associations representing Quantity Surveyors form the basis of his remuneration.

8. Furthermore, the Quantity Surveyor is entitled to charge in addition for any services rendered in advising the Architect from time to time, if called upon to do so, as to the issue of certificates, for the measurement and valuation of any additions or variations on the contract including the preparation of the final Statement of Account at completion.

9. If these duties are properly fulfilled no circumstances arise which would justify any arrangement between the two practitioners whereby fees are shared. Moreover, any such arrangement is thoroughly bad for the professional morale of both the Architect and the Quantity Surveyor, is calculated to discourage that care in their work which is of the first importance and is against the interests of the client for whom both act.

10. It cannot be too strongly emphasised that in the "*Principles which must govern Chartered Quantity Surveyors in interpreting their Scale of Charges*" published by the Royal Institution of Chartered Surveyors, in "*The Rules of Professional Conduct for Quantity Surveyor Members*" published by the Incorporated Association of Architects and Surveyors, and in the "*Code of Professional Conduct*" sanctioned by the Architects' Registration Council of the United Kingdom, it is laid down that their respective practitioners are to be remunerated solely by the professional fees paid by the client and are specifically debarred from any other source of remuneration, nor may they accept any work which involves the giving or receiving of any discounts, gifts, commission or other payment or consideration.

11. It follows, therefore, that where a Quantity Surveyor in private practice is instructed to prepare Bills of Quantities, any participation by the Architect in the Surveyor's fees is improper and cannot be countenanced. Apart from the fact that such participation is in the nature of a secret commission which, in certain circumstances, might render the parties liable to prosecution under the Prevention of Corruption Acts 1906 and 1916, it would, in the case of an Architect, constitute an infringement of the Code above referred to, and if brought to the notice of the Architects' Registration Council might be regarded by the Discipline Committee of the Council as disgraceful conduct.

12. Apart from the definite prohibition of sharing fees there are other matters to which attention should be directed.

13. In order that the client may fully understand his liabilities in respect of the payment of fees both to the Architect and the Quantity Surveyor it is strongly recommended that at the earliest stage the Architect should acquaint his client with the Scale of Charges upon which his own professional fees will be based, and at the same time explain the reasons which justify and require the services of a Quantity Surveyor and how the fees in this respect should be paid.

REVIEW OF CONSTRUCTION AND MATERIALS

This section of the JOURNAL *had perforce to lapse during the war years, but it is now revived. As before, it will be compiled from all sources contributing technical information of use to architects, principally from official and industrial research bodies, and from individual experts; thus every effort is made to ensure that the information given shall be as accurate as possible. The number of bodies dealing with specialised branches of research is large, but the following exist for the service of architects and the Building Industry, and will willingly answer enquiries.*

The Director, The Building Research Station, Garston, Nr. Watford, Herts. Telephone: Garston 2246.
The Director, The Forest Products Research Laboratory, Princes Risborough, Bucks. Telephone: Princes Risborough 101.
The Director, The British Standards Institution, 28 Victoria Street, Westminster, S.W.1. Telephone: Abbey 3333.
The Technical Manager, The Building Centre, 9 Conduit Street, W.1. Telephone: Mayfair 2128.

FOREWORD

Anxious spectators watching the resuscitation of a man just rescued from drowning do not expect him immediately to rush to his office and start work; they are content to let him look about for a few minutes to revive and get his bearings. In like manner it is felt that expectant readers of this Review, now arising from the submergence of the war years, will allow it a few lines in which to expel the watery contents of its chest and to take in deep breaths of high resolve in the cause of technical assistance to architects. The Review realises that it cannot hope to give information which is not already known to some, probably many, architects; at the same time it feels sure that the already-knowing will forgive, or skip, in the interests of those who may not happen to have met the particular point in the course of their work or studies.

Now a line or two regarding the tone of this Review. In presenting technical information obtained from learned sources anything approaching flippancy would be indecorous and unwanted; on the other hand, a man is not necessarily rendered less attractive by the fact that the dry bones of his skeleton are clothed in a warm and human integument. The Review, therefore, will aim at presenting information in a style and manner that will avoid on the one hand the informality of the fireside chat, and—on the other—the cold impersonality of an encyclopædia. But, be it noted, there would be excuse and precedent for a certain lightness of handling, to paraphrase Mr. Shinwell's words, because the Ministry of Fuel and Power have produced a booklet, under the title "You Amaze Me, Young Man," in which the benefits of insulation are set out in a colloquial manner, enlivened by light-hearted drawings of a smiling and bespectacled managing director listening to the insulation sales talk of an architect. As the booklet was prepared by a panel of experts representing, among other bodies, the Royal Institute of British Architects, it would seem that the human touch may be permitted in presenting facts and tendencies in construction, materials and appliances, and this less formal spirit seems well worthy of emulation.

Readers of the above introductory remarks will not be surprised to find that the first matter dealt with in the resuscitated Review is

GAS

At the opening last November of an exhibition "Gas in the Design of Living," at the Building Centre, the Chairman of the Council of Industrial Design—Sir Thomas Barlow—remarked on the difference between the appliances of to-day and those of fifteen years ago. Sir Thomas also spoke of what can be done "by approaching design problems with an imaginative understanding of the consumer's needs and by using good brains and sound artistic instincts to solve the problems which this approach reveals." The appliances on show at the exhibition prove the truth of Sir Thomas's remarks, due to the fact that well-known architects and industrial designers are at work on producing the new models.

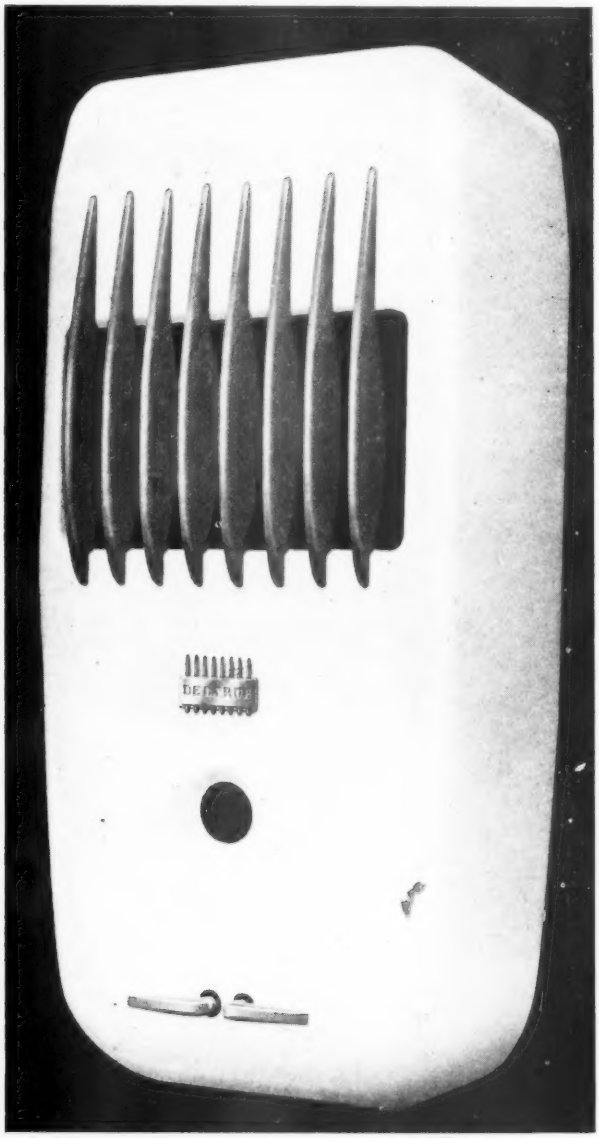
For example, there is the multipoint water heater, made by Messrs. De la Rue from a design by Mr. G. Grey Wornum [*F.*]. This water heater's ungodly innards are concealed behind a metal casing finished in white plastic, the louvres being coloured green. The heater conforms to the relevant B.S.S. and is intended to be suitable for positions in which the head of water is not great, but if the available head is less than 8 ft. Messrs. De la Rue suggest that they should be consulted about the sizes of supply and draw-off pipes and taps. The approximate overall dimensions of this heater are 35 in. high, 16 in wide, and 10½ in. deep. A gas cut-off safety device, spring-loaded and protected, renders the appliance as foolproof as human frailty permits. The casing is easily removed, to allow adjustments to

Refrigerator, by Messrs. Electrolux.

be made when required. Mr. Grey Wornum's design is efficiently simple, as simple as the basic principle underlying the mechanism of most water heaters, that is, the venturi tube.

Water heaters are accommodating appliances as they do not need to be touched, except for servicing, and so may be put on a wall and left to themselves. In the case of some other kitchen equipment the problem of position is not so easy, and nearly all involve some bending of backs, if they are housed under the recommended 3 ft. top line level. Messrs. Electrolux, Ltd., have produced a refrigerator, Model M.151, which can be had either free-standing, or incorporated below the 3 ft. line, or built into a fitment at a height convenient for access. The refrigerator is available for either gas or electric operation : the finish of the exterior is white and green enamel with chromium door furniture. The interior is porcelain enamelled. The capacity is 1½ cu. ft. Our illustration shows this refrigerator fitted at breast height in a vertical cabinet, and no doubt many architects have seen it at the " Britain Can Make It " exhibition.

The approximate dimensions are : 32 in. high, 21 in. wide, and 21 in. deep.



Designed by G. Grey Wonum [F.] Gas water heating has cut-off device.

ZINC

The first issue of the Zinc Development Association's Technical Bulletin No. 1 was made in March 1942, but war difficulties forbade continuance. Now, in conjunction with the Zinc Alloy Die Casters' Association, and the Zinc Pigment Development Association, a fresh start has been made, as well as a fresh numbering. Zinc Bulletin No. 1 (New Series) gives information and illustrations showing the correct method of laying zinc on a flat roof. It is common knowledge that zinc should not be laid in contact with copper, but a point that may be overlooked is that the corrosion products of copper, and even of iron, should not be allowed to discharge on to zinc roofs. The Bulletin gives 1½ in. in 8 ft. as the minimum slope for zinc covered flat roofs. Copies of the Bulletin may be obtained from the Zinc Development Association, Lincoln House, Turl Street, Oxford, free, on request.

BRITISH STANDARDS INSTITUTION

The Institution's 1946 Year Book was issued last month. It gives a subject index and a synopsis of each of the 1,300 British Standards now current. These standards have been prepared by representative committees of 44 different industries. In addition, the Year Book includes lists of members of the General Council, of the Divisional Councils and of the Industry Committees of the Institution, as well as other useful information concerning the work of the Institution. The Year Book can be obtained from the Publications Sales Department, British Standards Institution, 28 Victoria Street, London, S.W.1 price 2s. post free.

In connection with British Standards, the following note may interest those who received Circular 211/45, dated 29 November 1945, from the Ministry of Health. In that Circular the Ministry of Health required Local Authorities to conform to the standards listed in the Appendix to the Circular, in all future housing schemes.

Representations have been made by the R.I.B.A. to the Ministry of Health, pointing out that it was doubtful whether adherence to the standards should be compulsory, as their original intention was to set a standard of quality, rather than a stereotyped design for standardisation, and that if compulsory standardisation was to be enforced, the standards should be carefully considered to ensure that they were suitable for standardisation. The Ministry informed the R.I.B.A. representatives that the point had not been overlooked, and that compliance with the Ministry Regulation was not intended to be as rigid as might appear from the Circular.

RANDOM DEFINITIONS

In these fast-moving times terms come into general use of which the exact meaning may not be at once obvious, especially when they have first appeared in Ministerial circulars addressed only to Local and other Authorities. Others have been coined by the respective industries. Although such terms may have been explained before, it may possibly help the younger members of the profession to find them collected here ;" it is therefore proposed to include a few definitions from time to time ; they will not follow any particular order, and will possess no merit other than that students will know where to look for them.

COOKING OVENS

Vertical type : the oven is immediately below the hot plate, or cooking rings.

Horizontal type : the oven is at the side of the hot plate, tops being level.

Horizontal–eye level : the oven is at the side of the hot plate but raised, the bottom of the oven being level with the top of the hot plate.

GREEK HOUSES AT OLYNTHUS

By Professor R. E. Wycherley

Several years before the war Professor D. M. Robinson, of the Johns Hopkins University, Baltimore, excavated the Greek city of Olynthus in Thrace, and discovered the remains of a large number of houses built in the fifth and fourth centuries B.C. Most of the Greek houses known before were at Hellenistic sites (Priene and Delos, for instance). Olynthus is the first large residential area of classical Greek date to be thoroughly explored. Thus the houses have a unique historical interest; but apart from this they are interesting specimens of house design. A brief general account of them may serve a useful purpose since they have not yet found their way into general works on architecture, as far as I know, and the accounts in the archæological periodicals and Professor Robinson's magnificent publication of the site[1] (eleven volumes, with more to come) may not be conveniently accessible.

Classical Greek houses were mostly unpretentious, at any rate from the outside. The layout of residential quarters even in carefully planned towns was not ambitious; it could hardly be so when compactness was necessary for purposes of defence. There was extreme simplicity in external treatment and absence of calculated effects in the planning of streets and groups of houses. The Greeks of the fifth century claimed with pride that they put their best, architecturally, into temples and public buildings, and were content with modest private buildings. Houses which consisted of more than two or three rooms were built around a small court and turned in on themselves; such architectural interest as they possessed was concentrated in the interior. The Olynthian houses are no exception; but they are also surprisingly commodious and well-planned, and show that even in the fifth century Greeks of moderate means built themselves houses which would be quite comfortable by modern standards—if only good plumbing and a few other amenities were added.

Olynthus was built on two hills. The south hill was occupied by the older part of the town, and on it have been found scanty remains of small houses of poorer class, irregularly built. Most of the houses excavated belong to a new quarter built on the north hill. There are also several superior houses at Olynthus, of a type similar to the main body on the north hill but more elaborate, standing somewhat aloof. Apparently there was some residential segregation of classes at Olynthus. Whether this was at all general in Greece is very doubtful. On the whole it is not likely that in the old irregularly built cities there were definitely poorer and richer-class districts; probably in this as in other respects the elements were fairly well mixed. And in new towns laid out on rectangular "Hippodamian" lines the method of planning did not make for a strong differentiation of districts; in a city like Priene there is a certain uniformity about the whole. It is not to be imagined that in any Greek city there would be the complete difference in atmosphere which there is in a modern city between the well-to-do suburbs and the poor quarters huddled together in the centre; this difference is largely the result of the ability of the modern town to spread itself indefinitely.

The development of the north hill at Olynthus did not begin before the middle of the fifth century, perhaps not till 432 B.C. The houses were built between that date and 348, when Olynthus was destroyed by Philip of Macedon; it is seldom possible to date individual houses more precisely within the period. The quarter was laid out on strictly rectangular lines. The house blocks measured 300 by 120 feet (this is unusually elongated) and contained the unusually large number of ten houses each, divided into two rows of five by a very narrow alley, probably intended only for drainage and not for communication. The blocks were

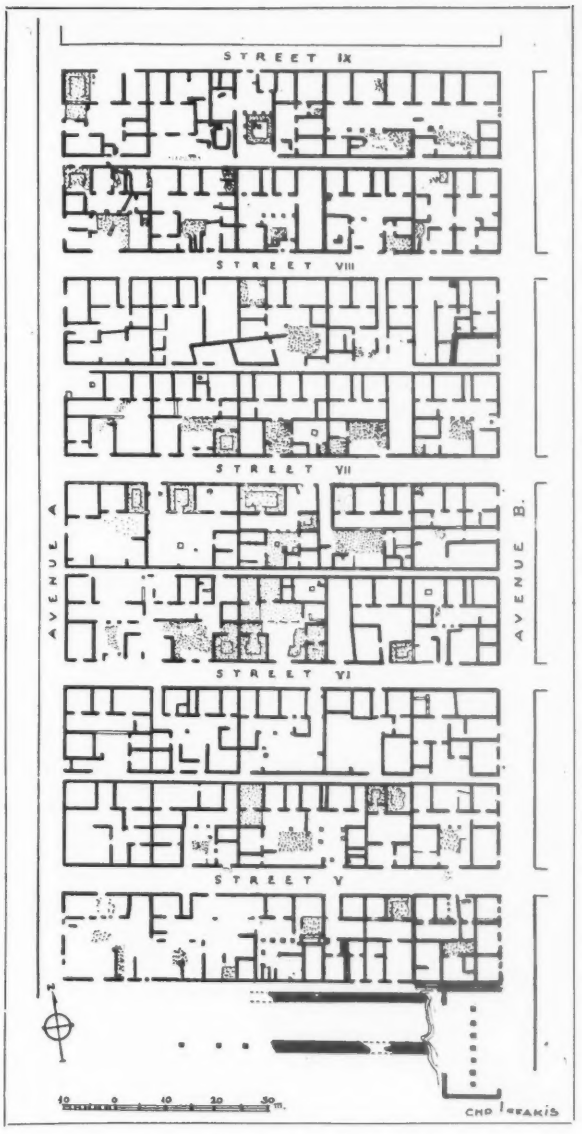


Fig. 1. Olynthus: plan of five blocks

formed by long avenues running north and south and a more numerous series of cross streets. Most of the streets were about 5 m. wide, but one of the long avenues was wider and formed the main street of the quarter, with a number of shops. The individual houses were roughly 60 feet square and had a courtyard in the middle of the south side (i in Fig. 2). The houses thus faced southwards, turning their backs to the north wind and catching the maximum of the winter sun, in accordance with the wise recommendation of ancient writers; this was so even on the north side of the block, though it made the entrance rather difficult to contrive in some cases.

A constant and dominant feature is a long narrow room (f) extending across the whole or nearly the whole of the house on the north side of the court, on to which it opened through pillars; this is probably what the Greeks called a *pastas*, and the excavators

have called the Olynthian type of house the "*pastas* type" after it. A series of important living rooms opened on to it from the north, usually including the main dining room and the kitchen. There were other rooms on the east and west sides of the court, but not on the south, which was formed by a plain wall if there was no colonnade. The court was usually cobbled and sometimes contained a cistern and an altar for a domestic cult; it might have colonnades on other sides as well as the north, and several houses had a complete peristyle like some of the houses of Delos. There was normally only one entrance, leading direct into the court; the door was sometimes flush with the outer wall, sometimes in a recess. The houses contained no dominant room as at Priene which could be said to form a nucleus; as the excavators say, "The underlying principle is one of growth by division rather than by accretion." As is usual in Greek houses, there is no attempt at symmetry of plan[2], though some houses accidentally approach it. The interior arrangement shows endless variety in detail. The rooms on the ground floor numbered about five to seven. Often they are impossible to identify. The main dining room (*andronk*) was distinguished by a low raised platform round the walls, on which couches would rest, more elaborate wall decoration[3], and a cemented or sometimes a mosaic floor—most rooms had floors of hard earth. The *pastas* and the colonnades too might be used as living rooms in good weather. There was apparently no elaborate provision for women's quarters in the Olynthian houses[4]. The kitchen (*e*) *in plan* can sometimes be identified by means of the hearth, which was in the middle of the room and consisted of four slabs of stone enclosing a rectangular space (though movable braziers have also been found); many kitchens had a curious annexe which the excavators formerly explained as an ingenious kind of flue to carry off the smoke, though more recent finds suggest it was used for cooking[5]. The bathroom, sometimes with a terra-cotta tub set in the floor, also frequently opened off the kitchen. For water supply, apart from occasional cisterns, the inhabitants must have depended on the city fountains; effective sanitary arrangements were non-existent. Store-rooms and work-rooms are identified in some cases by their contents—large jars, grain-mills, olive-presses, loom-weights (though the last have been found in all kinds of rooms). The houses were too small to need a porter's lodge like some of the larger houses of Delos. Bedrooms were presumably on the upper floor; there are traces of stairs leading up from the courtyard to the northern part of the house; the excavators find reason to believe that the upper floor extended only over the main northern part of the house, in most cases,

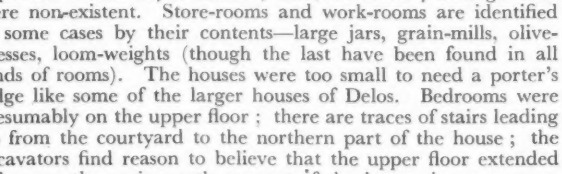


FIG. 2. *Typical house plan.*

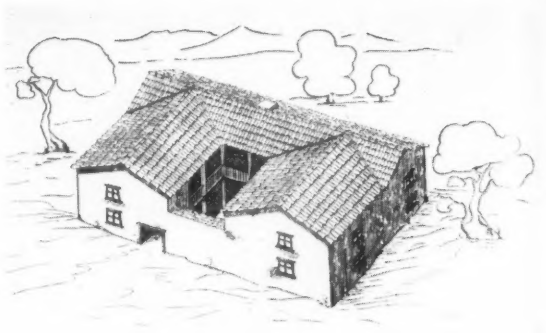


FIG. 3. *Restoration of the Villa of Good Fortune.*

and not over the east and west wings (though in the Villa of Good Fortune, which stands apart and is larger and more elaborate than most, the position of the staircase shows that the upper storey covered the wings too). There would be a gallery over the *pastas*, on to which the upper rooms would open. This arrangement of the upper floor accentuated the tendency of the house to turn southwards and catch the winter sun, while the galleries made for coolness and shade in summer when the sun was high.

The houses were of a construction commonly used in Greece for unimportant buildings—of unbaked brick[6], which may have had a coating of something more durable, on a foundation of rubble, with considerable use of wood of course—the pillars were mostly wooden—and convex terra-cotta tiles for the roofs. Minor finds provide masses of interesting evidence for the contents and equipment of the Greek house[7], but that is beyond our scope at the moment.

One would like to feel that the Olynthian houses fairly represent the normal fifth century Greek house; and in a broad sense they no doubt do. Professor Robinson and his colleagues go further and suggest with all due caution that this particular type, of which the *pastas* is most characteristic, is not unlikely to have been prevalent at Athens and elsewhere, and that the Priene type, in which the court is dominated by one large room with a monumental temple-like facade, is more likely to have been a local variety. The evidence is still too fragmentary to decide. There are partial analogies to the Olynthian houses at Delos and one or two less important sites but only at Olynthus is the type clearly marked and used on such a large scale.

Apart from their importance in the history of domestic architecture and the light they throw on Greek life the houses may be found to have some direct interest even now from the house-designer's point of view. One might re-emphasize one or two points in conclusion; for instance, the individuality of design allowed within the limits of the general type and the rigid frame imposed by the street plan; and the good sense shown in orientation; too often houses are planned without reference to their eventual orientation, and the north and south members of a pair are made symmetrical or houses on opposite sides of a street are made identical though this means that some rooms are very unsuitably placed. The Olynthian houses were laid out on the spot and criteria of temperature and comfort prevailed.

But their chief interest in still historical, and lies in the fact that they bring us peculiarly close to the domestic life of the ordinary Greek citizen in the greatest days of the Greek city-state.

NOTES

1. D. M. Robinson, etc., *Excavations at Olynthus*, Baltimore, the Johns Hopkins Press, 1929-1942; especially important for the houses is Vol. VIII, *The Hellenic House*, by D. M. Robinson and J. W. Graham. For a brief general account of Greek houses see D. S. Robertson, *Greek and Roman Architecture* (2nd edition), Chap. XVII. I must here acknowledge Professor Robinson's generous permission to use material and provision of illustrations.
2. Old reconstructions of the Greek house from literary material, as

laid out symmetrically on either side of an axis running through the court, are not borne out by archæological finds.

3. Most walls were left in the bare brick; but a varying number of the more important rooms had their walls stuccoed and painted, sometimes in monochrome, sometimes with one or two zones at the base of the wall in different colours. The zones are sometimes marked off by incisions, and occasionally there are vertical incisions too. Red was the predominant colour.
4. Archæological evidence at Olynthus as elsewhere does not suggest that the existence of women's quarters, of which we read a good deal in literature, involved any great modification or complication in the plan of the house. Vitruvius is misleading on this point (VI.7) as on others if his description is taken to apply to times much earlier than his own.
5. *American Journal of Archaeology*, XLIV. (1939), p. 53. (*d*) *In plan.*
6. There is evidence that baked brick was used here and there for additional strength (*A.J.A.* XLIV, p. 63).
7. See Vol. X of *Excavations at Olynthus.*

THE BRITISH CAST IRON RESEARCH ASSOCIATION JUBILEE

SPEECH BY THE PRESIDENT R.I.B.A.

At the luncheon celebrating the jubilee of the British Cast Iron Research Association, held on 11 December 1946, the President, Mr. L. H. Keay, O.B.E., was the guest of honour, and proposed the health of Dr. Harold Hartley, President of the Association. After referring to the occasion, the President said:

"I speak to you as an architect, and as such I cannot claim to possess more than a superficial knowledge of the interesting work upon which your Association is engaged, but I appreciate how much the work of the members of my profession may be influenced by the conclusions you reach and the information you can make available as the result of your research work. We must admit, I suppose, that some architects during the present century have shown a prejudice against the use of cast iron. It was particularly evident at a period when individual freedom of action was regarded as one of our outstanding characteristics. Though the pattern of the mould from which a casting was made was the work of the artist-craftsman the fear of endless repetition was disturbing to those who sought an outlet for their own individualism. It was unfortunate too that at a time when the standard of design was falling the mass production of standardised units was increasing. The earlier delicacy of the work of the artist-craftsman gave place to that of the less skilled but more flamboyant designer.

Most of us can recall examples of excellent work carried out in cast iron. In my earlier days, which were spent in the delightful city of Norwich, I well remember the delicacy of many gate piers and railings, one of which is illustrated in that excellent book "Cast Iron in Building" by Richard Sheppard. This book illustrates many other examples with which many of us are familiar. I often pass the massive entrance gates of the Sailors' Home in my own city, though I confess my eyes rest longer on the many cast-iron balconies, more delicate in design, which are still to be seen in many parts of London. I mention these instances to show the varied extent to which cast iron has been used by architects apart from the more common use as pipes, gutters, manhole covers—components in buildings lending themselves to mass production.

A material may fall into disuse for many reasons. A new material may take its place if it has other properties rendering it more suitable for specific purposes. On the other hand a change in fashion—and there are fashions in Art—may restrict its use. The wrongful use of a material may prejudice its use in conditions in which it would be eminently suitable, and I have little doubt that the over elaborate bandstands which could be ordered straight out of the ironfounder's catalogue of the late Victorian or Edwardian period prevented cast iron being used for many buildings of their type by those who desired to express individuality and delicacy of detail in their designs. As my friend John Gloag says in "The Missing Technician" . . . "the mishandling of cast iron between the middle years of the last century and the nineteen-twenties, has caused many people to regard it as hopelessly old-fashioned, a view that is soon corrected by knowledge of the progressive improvements in the qualities and capacity of cast iron achieved by contemporary research."

If I may, I should like to quote two other examples of the use of cast iron which will be familiar to all and in which I doubt if any other material could have been more advantageously used. I refer to the prefabricated telephone kiosk designed by a distinguished President of the Royal Institute—Sir Giles Gilbert Scott—and that semi-prefabricated building, the Crystal Palace. Compared with its elegant iron prototype the concrete telephone kiosk is an artistic failure and I cannot believe that a Crystal Palace in reinforced concrete would have achieved the lightness and elegance of Paxton's masterpiece. And so I might go on to catalogue the many uses of cast iron from the building of the first bridge across the Severn in 1779 by a Shrewsbury architect, Thomas Pritchard, down to the present day when thousands of people are being delayed in their important work by the shortage of light castings.

I must, however, refer briefly to the work your Association is doing. There is an idea prevalent that all research should be centralised under Government control. Whilst I realise there is much that can be said in favour of this there is perhaps more to be said for the unrestricted research carried out by associations like yourselves and by great industrial undertakings. Some measure of faith and even a benevolent disregard for expenditure is necessary if research is to be successful. In the bureaucrat obedience to regulation is accounted a greater virtue and disregard for expenditure a vice. There is, therefore, much to be said for independent research work. I gather that your Council is desirous of doubling your yearly income and in that venture I wish you every success. Much has been done already to improve the surface finish of cast iron, but much still remains. We have passed the stage when the black-leading of kitchen ranges and living room stoves is a necessary form of physical training, founded apparently on a belief that everything associated with a fire must be black. To-day the modern cooker with its light enamelled finish is rapidly becoming universal.

I understand that you have recently stabilised a Building Uses Department in charge of a consultant architect, and I commend your Association for the wisdom of this step. There is little doubt that one of the reasons for a decline in the use of cast iron was due to the flamboyant antics of those responsible for the extraordinary erections still to be found in many of our seaside towns, many of which were in the process of development in the years of declining taste in the Victorian period. There is no need for so much ugliness in the world. It can be reduced, if not prevented, by the closer co-operation of the technician and the designer. In the world of building there is still much to be explored. New uses will be found for old materials and new materials may replace those with which we have been long familiar. The information which your new department will make available to architects and industrial designers will be of inestimable value.

And so I wish well to your Association. Never before have we been presented with such opportunities for progress and expansion and therefore an intensification of research work is essential. Architects will await the results of your studies with interest. We shall be willing to co-operate with you on all occasions, for it is our desire that the appreciation of the beautiful in life shall be common to all our people and we realise that this appreciation may be hastened or retarded by the creation of even the commonest components in daily use to a good or bad design."

NOTES FROM MINUTES OF THE COUNCIL

MEETING HELD 10th DECEMBER, 1946

The Honorary Fellowship

The Secretary reported that the Rt. Hon. the Earl of Crawford and Balcarres [*Hon. A.*] had accepted nomination as an Honorary Fellow.

Appointments

A.R.C.U.K. Admission Committee: Mr. Arthur Bailey, O.B.E. [*F.*] (in place of Mr. W. M. Woodhouse [*A.*]).

Women's Advisory Housing Council: Miss Jane B. Drew [*F.*].

Registration Board of the National Register of Electrical Installation Contractors: Mr. George Fairweather [*F.*], Mr. Cecil H. Perkins [*A.*].

The Housing Centre: Standing Conference on Housing Education: Miss Jane B. Drew [*F.*].

R.I.B.A. Architecture Bronze Medal: Western Australian Chapter, R.A.I.A.: Lieut.-Colonel A. J. Hobbs [*F.*] (Perth, Western Australia).

International Federation for Housing and Town Planning: Mr. L. H. Keay, O.B.E. (President), Sir Patrick Abercrombie [*F.*], Mr. Edward Armstrong [*F.*], Mr. W. Dobson Chapman [*L.*], Mr. A. W. Kenyon [*F.*].

Government's Further Education and Training Scheme: Architectural Panel of Ministry of Education: Mr. D. H. Beaty-Pownall [*A.*], additional to Mr. C. S. White [*F.*].

Proposal to appoint an Architectural Science Board Correspondent in each of the Areas of the Allied Societies

The Secretary reported that the proposal of the Architectural Science Board to appoint a correspondent in each of the areas of the Allied Societies had been approved in principle by the Allied Societies' Conference, but that they were of opinion that the question of the actual appointment of a correspondent should be a matter for consideration by each Allied Society. It was agreed that the Allied Societies should be advised accordingly.

Royal Gold Medal

The Council approved the recommendation of the Royal Gold Medal Committee that the name of Professor A. E. Richardson, R.A., M.A., F.S.A. [*F.*] be submitted to His Majesty the King as a fit recipient of the Royal Gold Medal for 1947.

International Reunion of Architects, 1946

The Secretary submitted a letter dated 25 November 1946 from Sir Patrick Abercrombie [*F.*], President, British Committee International Reunion of Architects, expressing on behalf of his colleagues their thanks to the Institute for the hospitality extended to the foreign delegates at the recent International Conference in London.

Examination for the R.I.B.A. Diploma in Town Planning

On the recommendation of the Board of Architectural Education, the Council agreed that the Degree Course in Town and Country Planning at the University of Durham be recognised for exemption from the Examination for the R.I.B.A. Diploma in Town Planning.

School of Architecture, Sir J. J. School of Art, Bombay: Appointment of R.I.B.A. representative on the Government Board of Examiners

The Board of Architectural Education reported that as a matter of urgency they had approved the appointment of Mr. Claude Batley as R.I.B.A. representative on the Government Board of Examiners of the Bombay School of Architecture in place of Mr. H. J. Billimoria.

The Dundee School of Architecture

On the recommendation of the Board of Architectural Education the Council agreed that recognition of the 3 years' full-time course and the 4 years' part-time course at the Dundee School of Architecture for exemption from the R.I.B.A. Intermediate Examination be continued under the usual conditions.

The Hull School of Architecture

On the recommendation of the Board of Architectural Education the Council agreed that recognition of the 3 years' full-time course at the Hull School of Architecture for exemption from the R.I.B.A. Intermediate Examination be continued under the usual conditions.

The Oxford School of Architecture

On the recommendation of the Board of Architectural Education the Council agreed that recognition of the 3 years' full-time course at the Oxford School of Architecture for exemption from the R.I.B.A. Intermediate Examination be continued under the usual conditions.

R.I.B.A. Henry Jarvis Studentship (£50), Architectural Association School of Architecture, 1946

The Board of Architectural Education reported that the R.I.B.A. Henry Jarvis Studentship at the Architectural Association had been awarded to Mr. F. S. Knight.

R.I.B.A. (Archibald Dawnay) Scholarships

The Board of Architectural Education reported that an R.I.B.A. (Archibald Dawnay) Scholarship of £65 for the year 1946-47 had been awarded to Mr. D. W. Fletcher.

R.I.B.A. Maintenance Scholarships

The Board of Architectural Education reported that R.I.B.A. Maintenance Scholarships for the Session 1946-1947 had been awarded as follows: (1) The R.I.B.A. 4th and 5th Year Maintenance Scholarship (value £60 per annum) to Mr. J. S. Miller. (2) The Howe Green 4th and 5th Year Maintenance Scholarship (value £40 per annum) to Mr. A. J. Mellor. (3) The "Builder" Maintenance Scholarship (value £60 per annum) to Mr. E. Sheard.

The Maintenance Scholarships awarded to the following candidates had been renewed for a further period of one year: (1) Mr. G. S. Cornelius-Wheeler (Bartlett School of Architecture, University of London—R.I.B.A. Houston Maintenance Scholarship of £125 per annum). (2) Mr. H. W. D. Burgess (Welsh School of Architecture, The Technical College, Cardiff—R.I.B.A. Houston Maintenance Scholarship of £125 per annum. (3) Mr. P. T. Barefoot (Architectural Association School of Architecture—R.I.B.A. Houston Maintenance Scholarship of £100 per annum). (4) Miss A. P. Broughton (Architectural Association School of Architecture—Ralph Knott Memorial Maintenance Scholarship of £45 per annum).

Membership

The following members were elected: As Honorary Associates, 2: as Honorary Corresponding Members, 2; as Fellows, 12; as Associates, 94; as Licentiates, 30.

Election: 11 February 1947

Applications for election were approved as follows: As Honorary Corresponding Member, 1; as Fellows, 7; as Associates, 15; as Licentiates, 40.

Election 6 May 1947

As Fellow, 1; as Associates, 5.

Applications for Reinstatement

The following applications were approved: As Fellow: Henry Anthony Mealand. As Licentiate: Vamanrao Vithalrao Vadnerkar.

Resignations

The following resignations were accepted with regret:—

Charles Henry Edward Bridgen [*F.*]; Alexander F. Mackenzie [*F.*]; Gerald Thorley Dyson [*A.*]; Henry Hyland [*L.*]; Donald MacDonald Mackie [*L.*].

Applications for Transfer to Retired Members' Class under Bye-law 15

The following applications were approved:—

As Retired Fellows: Arthur Ashton, Henry Philip Burke Downing, Norman Elliot, Frederick George Hicks.

As Retired Associate: Claude William Davis.

As Retired Licentiates: Arthur Boulton, Harry Sugden Porter, Maurice Tobias.

Obituary

The Secretary reported with regret the death of the following:—

Ewart Gladstone Culpin, P.P.T.P.I., J.P. [*F.*] (Mr. Culpin was awarded the R.I.B.A. Distinction in Town Planning. He was a former member of the Council); Henry Clifford Hollis [*F.*]; William Harold Watson [*F.*]; Frederick Marshall Dryden [*Retd. F.*]; Alexander Nelson Hansell [*Retd. F.*]; Major Edwin Summerhayes, V.D. [*Retd. F.*]; William Joseph Waghorne [*Retd. F.*]; William Brown Whitie [*Retd. F.*] (Mr. Whitie was a former member of the Council and the Allied Societies Conference); Arthur George Blackford [*A.*]; Albert Leslie Knott [*A.*]; Francis Percy Mark Woodhouse [*A.*]; William Herbert Alton [*L.*]; Richard Henry Thomas Bard [*L.*]; Ronald Campbell Blair Arnold Daniel [*L.*], killed on active service; Walter Jackson [*L.*]; Stacy Bowen Williams [*L.*]; James Edward Stott [*Retd. L.*]; Godfrey Ernest Mortimer, D.F.M. [*Student*], killed on active service; Walter George Steele [*Student*], killed on active service.

NEW LIGHT IN OLD BUILDINGS

A PAPER PRESENTED BY MR. S. ANDERSON AND MR. E. H. PENWARDEN AT A MEETING OF THE R.I.B.A. ARCHITECTURAL SCIENCE BOARD

WEDNESDAY, 6 NOVEMBER, 1946

Mr. C. G. STILLMAN [V.-P.], *in the Chair*

The Chairman said he had the pleasant duty of extending a welcome to the members of the Illuminating Engineering Society, and in particular to their President, Mr. J. S. Dow, also to their Honorary Secretary, Mr. H. C. Weston, and to the Assistant Secretary, Mr. G. F. Cole. Secondly, he had the pleasure of introducing the lecturers, Mr. S. Anderson and Mr. E. H. Penwarden, but would first invite a few words from the President of the Illuminating Engineering Society, Mr. Dow.

Mr. J. S. Dow said he was very glad indeed to have an opportunity of saying, on behalf of the members of the Illuminating Engineering Society, how much they appreciated the invitation, and how much they welcomed these joint meetings with the Royal Institute of British Architects.

In his recent presidential address to his own society he had laid stress on the importance of co-operation with other bodies and he could think of no society from whom they had more to gain by the exchange of information than the Royal Institute of Britsh Architects.

The subject was a very wide one. The authors were agreed on the principle of adapting fittings in old buildings, but there were many things to consider, such as the nature of the lighting as a whole, whether it applied to a particular building, and whether one could follow the same ideas that would normally guide one in illuminating engineering, and there were always the peculiar whims and fancies of the consumer.

Mr. S. Anderson, B.Sc., said :

Modern standards of illumination have advanced to such an extent that the public are becoming more and more critical of the subdued lighting that for years has been accepted as adequate in many buildings of historic interest. In public buildings of more recent origin, the illumination was up to recognised practice in their day, but now falls far short of modern standards in both intensity and quality.

Much has already been done in the industrial field to rectify this state of affairs, and fluorescent lighting units in their thousands have been successfully applied, but when æsthetic considerations have to be taken into account the application of scientific lighting principles has to be co-ordinated with architectural and decorative requirements, where the shape and size of the light source and the quality of the light play such an important part. It is therefore proposed to limit the scope of this paper to a consideration of some aspects which may be of interest to the architect concerned with the installation of new lighting in old buildings, making use of the most suitable light sources.

First it will be appropriate to review some reasons why improvement is desirable, and to discuss what has been learned in lighting technique, much of which has been developed since the original lighting was installed.

Firstly, improved distribution of light may be required. With old installations, one frequently finds wide variations exist in the illumination provided from point to point in a room, the whole of which is devoted to a given purpose. While such variations may often be tolerable and even desirable with daylight in which the minimum illumination may well be in the region of 100 L/sq. ft. in the case of artificial light the order of intensities obtaining is so much lower that a wide variation gives rise to an objectionable difference in facility of vision from place to place. The existence of these variations, and the protests of those who experience them, are frequently made evident by the presence of supplementary lighting in the form of additional and often incongruous pendants, table lamps, or bracket lights. Ill-conceived supplementary lights, usually chosen with great regard to economy in initial cost but little to fitness of form, do much to spoil the appearance of a fine interior.

Better distribution may also be necessary on the score of comfort and cheerfulness. In public buildings which are consistently used for a specific purpose, such as churches or assembly halls, even illumination adds materially to comfort and cheerfulness. It must be within the experience of most of us to have seen the seating accommodation of an interior very unevenly occupied. While there are other reasons, in many instances this can be directly attributed to a high diversity of illumination.

Thirdly, better distribution may be required for revealing beauty. The architectural features of many historic buildings have for generations been concealed in gloom, especially in the case of those that are mainly used under artificial light. Some upward illumination is always desirable ; the proportion varies with the height of the ceiling and its decorative treatment. In cases where the ceiling is not unduly high and has a reasonably good reflection factor, it can be effectively used to improve the general distribution of light and to reveal architectural features to better advantage.

Fourthly, where the old installation employed lamps of low wattage, improved colour rendering is obtainable by a change to suitably accommodated lamps of larger sizes. But improvement of a far greater degree is achieved by the use of fluorescent lamps with which colour rendering and appearance much closer to daylight than that practically obtainable from any other type of lamp is achieved. There is little doubt that in the fluorescent lamp we have for the first time the possibility of both colour rendering and source colour which are comparable with natural light.

It must be remembered that the colour quality of the light from the lamp may be modified subtractively by selective absorption in the fitting, and that portion of the light which is reflected may be similarly modified by the walls and ceiling. Colour rendering is also to some extent dependent on the level of illumination. Experience has shown that, whether the lighting is natural or artificial, a high intensity is necessary for critical appreciation of colour.

Fifthly, apart from a slight increase during the recent war, the cost of artificial light per lumen hour has been progressively reduced over many years. Thus, in buildings where the lighting installation is an old one the amount of light provided is often more in accord with the economies obtaining when it was planned than with those of the present time. Not only do present day standards demand more effective illumination, but the current lower cost of electricity and of lamps renders it possible to provide a higher standard economically.

But the economy of new lighting for old buildings is not based only upon these factors. Due to improved technique and to the

availability of improved materials for light control, more efficient use can now be made of the light generated in the lamp. Much of the advance made in the efficiency of filament lamps has been secured without alteration to old lighting installations, but the increase in efficiency obtainable by the use of fluorescent lamps, which give two and a half to three times the light output of an equivalent wattage of filament lamps, can only be secured by a new lighting installation. Their dimensions, and the auxiliary gear necessary, usually prohibit their use in old fittings.

While lighting is only one of the many services with which the architect is concerned, it must surely be regarded as an important item, for it must be relied upon for the appreciation of form and decoration. Due economy will usually be necessary in the interest of the owner, but it is neither in the best interest of the owner nor of the architect that lighting should be treated parsimoniously, for a poorly conceived and executed lighting installation may well mar the appearance of an otherwise fine interior, both by day and by night. The form and pattern of the lighting fittings is generally evident in daylight, even though their effectiveness is only seen after dark.

Present Lighting Technique

In many cases the lighting in old buildings such as are envisaged in the present paper was limited more by what was then known and available than by any intentional "skimping the job." In both form and workmanship the lighting fittings were worthy of the interiors for which they were made. But they were designed to take lamps of small size and low output, to incorporate glass which was either clear or of poor transmission, when curved mirror reflectors were almost unknown, and when electric light was following somewhat blindly along the lines which experience had shown to be suitable for candles, oil or gas lamps.

Before going on to discuss more detailed matters of technique, it may be well to recall the fundamentals upon which contemporary illuminating engineering is based: principles which were far less widely appreciated formerly than they are to-day.

Relationship between Light and Vision

A combination of research and experience has established the relationship between light and vision. There is no doubt that practically any visual task is performed more easily, more quickly and with less strain with a high level of illumination than with a low one. The more difficult the visual task the higher the level of illumination required for maximum facility; and the relationship between increase in illumination and improvement in visual acuity is more nearly logarithmic than linear. The general surrounding brightness should not be much less than that of the particular field of regard. No brightness greatly in excess of the general room brightness should exist in or near the field of vision either directly or by reflection. We see by contrast—contrast in brightness, in colour and in texture. The lighting installation should bring out these contrasts by virtue of its directional and colour qualities, as well as by the intensity of the illumination; yet in providing such illumination, general appearance and atmosphere must not be sacrificed. These are the broad principles upon which contemporary illuminating engineering is based.

Revelation of Form, Texture and Colour

In an old building there is frequently a great deal of beauty in the textures, colour and decorative forms used. Their revelation is dependent on the lighting and it is therefore of great importance that any modernised lighting scheme should be successful in these respects quite apart from its function to provide adequate illumination on the working plane.

Revelation of form or relief is obtained when the illumination is received predominantly from one direction. In some cases, such as symmetrical forms, it matters little which is the direction chosen so long as it is oblique, but in others of an asymmetric character, such as statuary and other forms found in nature, the form appears distorted and often almost unrecognisable unless the light comes predominantly from above. While all lighting is directional to a degree, considerable variation in this characteristic is possible in the design of the fitting. The position and mounting height of the fitting are also of importance in this connection.

It is generally desirable to avoid extreme contrast in brightness between high lights and shadows, otherwise any detail existing in the shadow is lost and a harsh effect is produced. One way of ensuring that shadows are soft is by the use of well-diffused general lighting with no marked directional qualities, coupled with strongly directional auxiliary lighting arranged to pick out the highlights.

From the illumination standpoint, texture reacts in much the same way as form but with a much finer "grain." A high level of illumination is therefore necessary for the full appreciation of the detail, and the directional component in the lighting may be required at a fairly acute angle to the textured surface. In some cases the pattern on a textured surface is mainly due to differences in gloss or to the presence of a glossy pattern on a matt ground. Much of the life in such a surface is due to direct specular reflection from the glossy portions. Lighting should therefore be arranged to provide a surface of suitable brightness in such a direction from the textured surface that its direct reflected ray emerges towards the eye.

The revelation of colours in their daylight hues is dependent upon the presence of the colours in the composition of the light falling upon them. The relative proportions in which the colours are present must approximate closely to those in natural light. These requirements have presented a difficult problem, for natural light is very variable in composition; it varies from hour to hour and it varies according to the aspect of the sky providing the illumination.

The colour rendering properties of the light from filament lamps can be improved by the use of filters to give a light of more nearly daylight colour composition. With fluorescent lamps the colour of the light is controlled in manufacture by the composition of the fluorescent material used.

Characteristics of Contemporary Electric Light Sources

(*a*) Tungsten Filament Lamps

There are very many cases in which the re-lighting of old buildings can be successfully accomplished by means of filament lamps, and a considerable number in which the use of these lamps is definitely preferable. The lamps at present available embody in their performance improvements which have been made as the result of over half a century of research work and practical experience. The most recent improvements have taken the form of increased light output for a given wattage.

Linear striplite and architectural lamps employing extended filaments are less efficient than general service lamps of equivalent wattage. Their use can only be justified by their effectiveness in a particular location. The longer architectural lamps are far outstripped in performance by the existing 5 ft. and 4 ft. fluorescent lamps, and the position with the shorter linear filament lamps will be similar when corresponding lengths of fluorescent lamps become available.

The brightness of the filament in a gasfilled lamp is of the order of 2,000 candles per sq. in., and while the internally frosted "pearl" bulb reduces the maximum visible brightness to about 100 candles per sq. in. a brightness of this order is far too great to be comfortable under normal conditions near the direction of vision. Thus some form of shading or light control is essential. Due to their relatively small dimensions, filament lamps lend themselves well to close light control by refraction or reflection and they can be accommodated in diffusing fittings of small size which are both convenient and economical.

(*b*) Fluorescent Lamps

Much of the development work on fluorescent lamps was carried out in England before the war, but for which they would have been placed upon the market in this country at about the same time as they were introduced in the United States. Production in this country was strictly limited to meet essential war-

time needs until the end of 1944. Thus experience of their general use in this country is virtually limited to the post-war period.

In the fluorescent lamp, 90 per cent. of the visible light is due to the fluorescence of the powder coating on the inner surface of the glass tube. This powder, or "phosphor," is energised by ultra-violet radiation generated in the electric discharge through the low-pressure mercury vapour contained in the tube. Only the remaining 10 per cent. of the light emitted by the lamp comes directly from the electric discharge. Thus, the colour of the light is determined by the composition of the phosphor used. At present two types are available. One called "daylight" is intended to imitate the colour of the light from a sunny sky when obscured by light clouds. The other, called "warm white," is a good deal warmer in tone and pinkish in appearance. From a colour rendering standpoint, the daylight lamp is preferable and its light blends extremely well with natural light.

The warm white type is sometimes preferred, however, owing to its genial tone and to the fact that it is inclined to be flattering to the complexion. Where lamps are employed in pairs or closely spaced, a pleasing blend of light intermediate in colour between the two is obtained by employing one daylight and one warm white lamp.

When first put into service, fluorescent lamps give appreciably more light than their rated output, which is the average value during a normal life. The fall off is relatively rapid during the first 100 burning hours, after which the deterioration is quite small.

Fluorescent lamps are at present made in 5 ft. and 4 ft. lengths, the former rated at 80 watts and the latter at 40 watts. Thus in spite of their large physical size and high efficiency, they are essentially light sources of limited output, and in many cases multi-lamp fittings are necessary to achieve modern standards of illumination without making the number of fittings excessive. Owing to their low surface brightness there are some situations in which fluorescent lamps may be used without shades or diffusing media.

The life of fluorescent lamps is rated a 3,000 hours for the 80 watt and 2,500 for the 40 watt size, thus where re-lamping presents difficulties owing to labour availability or difficulty of access, they are preferable to tungsten filament lamps on this account.

Disposal of Auxiliary Gear for Fluorescent Lamps

Several factors influence the disposition of the auxiliaries which are necessary with fluorescent lamps. Since each lamp must have its own individual starter and choke, it is economical to arrange for these to be placed close to the lamp. But where there is no convenient position available the choke can be placed remotely, and there is no limit to the permissible length of the intervening wiring. Where a considerable number of lamps are involved, the provision of separate feeds to each from a remote choke position becomes cumbersome and expensive.

While originally only a cubic shape of choke was made, a second type, of long slim proportions, is now available and this lends itself admirably to housing in many convenient spaces where it was not possible to accommodate the earlier cubic shape. Power factor correction capacitors are now also made in similar slim proportions and it is usually possible to accommodate these near the chokes.

Chokes in operation generate a small amount of heat, and it is therefore necessary to allow an air circulation space round them. Ventilating of the choke housing is desirable where a number of chokes are housed together, but single chokes may be used in unventilated enclosures provided that the ambient temperature is not abnormal. Where a number of chokes are housed together a free air space should be allowed round each.

Cold Cathode Fluorescent Tubes

These were introduced a few years before the war in the form of made-to-measure installations principally in stores, restaurants and public buildings. Cold cathode tubes are made to give daylight and warm white light using phosphors similar to those in fluorescent lamps. In addition an intermediate white is available. With each of these the efficiency is comparable with that of the fluorescent lamp.

Short tubes of the cold cathode type are inefficient because there is a considerable dissipation of power at the electrodes and this is independent of the tube length. Thus long tubes are preferable and in practice a maximum straight length of about 10 ft. is the present limit for an individual tube, due to manufacturing and handling considerations. The tubes can be curved or bent during manufacture and this makes it possible to follow a structural feature, such as the curve of a barrel ceiling, with cold cathode lighting. It also makes it possible to provide apparently continuous lines of light by turning the tube electrodes through 90 or 180 degrees so that luminous portions butt up together. Since they carry a high voltage, the tube electrodes are housed in earthed metal boxes to ensure safety.

Standard Units

Cold cathode lighting is at present principally made in standard self-contained units, each consisting of three tubes with combined electrode and transformer boxes, the whole being carried on a metal channel with an overall length of 10 ft. The service light output of such a unit is rather more than 5,000 lumens or roughly equivalent to that of two 200 watt filament lamps, and its power consumption is approximately 240 watts.

Cold cathode tubes have an extremely long life, and this is determined more frequently by drop in light output than by failure. A rated life of 6,000 hours is quoted, but instances have been reported where tubes which have served up to three times this figure are still in operation. A gradual fall off in light output occurs, but there is not such a sharp initial fall as in the case of the hot cathode fluorescent lamps.

Light Control Methods

Tungsten filament lamps are seldom used without some measure of light control. Even when the lamps are used unmasked it is usual to install a translucent glass shade to provide a brightly illuminated background in close proximity to the lamp in order to reduce the brightness contrast of the lamp to its surroundings.

This practice has been extensively developed with the object of increasing the efficiency of the lighting by utilising glass, perspex or metal shades with scientifically designed contours to reflect the light in any desired direction. This principle can be effectively applied to specially designed fittings where a combination of efficiency and decorative effect is necessary.

It is economical to provide some form of control which will reinforce the light output in preferred directions at the expense of the output in less important directions. Three methods are available. They employ the optical principles of reflection, diffuse transmission and refraction.

Reflectors of silvered glass or polished metal are employed to re-direct the light falling upon them into a beam or fan of light towards the plane to be illuminated. Being specular, the angular width of the beam and its direction are controllable by the contour of the reflector and its position in relation to the lamp.

Reflectors of white enamelled metal or other white opaque surfaces re-direct the light falling upon them in a more or less diffused manner according to the nature of the surface. Translucent materials such as opal glass or plastics transmit and diffuse a proportion of the light falling upon them, while a proportion, dependent upon the angle of incidence and the nature of the material, is reflected more or less specularly. With refractors the emerging light may be diffused if the figuring of the medium is irregular, as in hammered or raindrop glass, or it may be more closely controlled where the medium is of regular prismatic or reeded form.

Where the whole of the lamp light is caught by the controlling medium all will be controlled, but where only a portion of the light is caught, the remainder is uncontrolled and in practice the latter condition is the more usual. In other cases, the direct (uncontrolled) light from the lamp is used to illuminate the

nearer portion of the area to be covered while the portion which is controlled is directed towards the more distant parts of the area. The concentration thus achieved helps to equalise the illumination over the whole area.

Materials

(*a*) Glass

Most of the materials used as diffusing media are too well known to require detailed description. Flashed opal glass is perhaps the most widely used where a soft lighting effect is favoured. Clear figured glass is used where some degree of diffusion without loss of vitality is required, especially where maximum efficiency is essential and directional reflectors are installed. Ribbed glass is most effectively used with fluorescent lamps under similar circumstances.

(*b*) Perspex

Much interest has been aroused by the introduction of plastic material under the name of Perspex. It can be moulded or bent into suitable forms and curves for lighting requirements, and as it is not brittle it makes an excellent substitute for glass. It is, however, subject to temperature limitations. Moulded forms may be liable to distortion at temperatures above 80 deg C. It is safe for use with fluorescent lamps and relatively low wattage tungsten lamps.

There are two types of Perspex commercially available for lighting purposes, namely "clear" and "opal." Up to the present the clear perspex is not generally available with a surface suitable for the diffusion of light. Various frosted effects can be obtained by the application of lacquers and by sandblasting, and samples have also been made simulating the figuring of morocco and stippolite glass.

Clear sheet Perspex can, however, be treated by machining a reeded surface on it, and is being successfully used as a sparkling diffusing medium for tungsten and fluorescent lamps.

Medium opal Perspex has a high reflection factor. It is extensively used in the form of moulded trough reflectors and is available in several attractive pastel colours, but owing to its low transmission factor it is not satisfactory as a light diffusing medium.

(*c*) Anodised Aluminium

Anodised aluminium and aluminium alloys will probably be extensively used in the construction of lighting fittings and much experience has already been obtained in its use for reflectors. Brightened and anodised aluminium reflectors have good optical characteristics but are limited in their usefulness by liability to atmospheric attack. In their present stage of development they are not suitable for locations where any extensive condensation or wetting may occur in the presence of corrosive agents. Details of the grades available and their properties are given in the paper.

Mr. E. H. Penwarden then continued the lecture, and began by showing a number of lantern slides.

Types of Buildings

The variety of architectural styles one can envisage in the title "Old Buildings" enlarges the scope of this subject to such a degree that it is necessary to deal with broad principles, and to give concrete examples of their application in a small selection of typical buildings.

These can be divided into two categories :—

1. Old buildings of historic interest, requiring improved lighting.
2. Old buildings of later period requiring modern standards of illumination.

Old buildings of historic interest do not usually require very high intensities of illumination, but better lighting than was possible with the primitive facilities available at the time of the erection of the building. Those of later period requiring modern standards of illumination would in the majority of cases have been originally installed with electric light.

The methods of treatment can be extremely varied but the one selected should be based primarily on an effort to envisage what the original architect would have done if he had the facilities of modern lighting equipment, and a knowledge of its scientific application, at his disposal.

There are many instances, however, where this is not too obvious and in such cases it is essential to strike a balance between the requirements of the architect and of the illuminating engineer. To do this it is necessary to explore the line of approach of both parties to the problem.

The architect will be mainly concerned with the preservation of the architectural characteristics of the room. He will therefore be almost sure to impose restrictions regarding the positioning and appearance of the structure required to house the lighting equipment. This will enforce a measure of restraint on the illuminating engineer, who is trained scientifically to calculate lighting requirements and to specify the equipment and location of the apparatus necessary to obtain the accepted illumination values. Past experience indicates that this difference of approach can be resolved by a compromise leading to quite satisfactory results.

The functional uses of buildings vary as largely as their architectural characteristics, consequently the possible solution of the lighting problem is subject to like variations. It is seldom that identical methods can be adopted in two or more buildings; some modification is usually necessary to meet local requirements.

The architect will be faced with the problem of the proportions and design of the fixtures required to house the lighting equipment. At this stage we may introduce the fittings designer, whose principal responsibility is to translate the ideas of the illuminating engineer and of the architect into a functional unit of sound mechanical construction in æsthetic harmony with its surroundings. The measure of his responsibility varies considerably, in fact to such a degree that he requires more than a superficial knowledge of the principles of illuminating engineering as well as a keen appreciation of architectural requirements.

There is a strong consensus of opinion that the industrial designer should be drawn from the ranks of the architectural profession, but practical manufacturing experience is indispensable if designs are to be produced on a sound constructional and economical basis. Let us therefore accept the principle of triple co-ordination in discussing in more detail the broad lines of approach to the problems involved.

Methods of Treatment

The method of treatment will always be governed by any limitations imposed by practical installation requirements, the two main factors being wiring and maintenance.

In old buildings of historic interest with lighting fixtures already installed and which, however inadequate they may be as light sources, form an integral part of the interior decorations or for traditional reasons must be retained, the method of treatment which obviously suggests itself is to adapt the existing fittings.

Candle fittings can usually be adapted to take the much abused electric candle fitments and the light from these may in turn be augmented by additional tungsten lamps concealed in the fitting (if it lends itself to such treatment), or alternatively in some structural feature either existing or provided. Such additional lighting sometimes creates the illusion that the light is coming from the old fittings.

In cases where the old fittings are unsuitable for adaptation and can be dispensed with, the straightforward application of modern light sources might be successfully applied but the chief problem likely to present itself in historic buildings is brightness contrast. The walls are usually very dark, and a bright light source silhouetted against them would appear very harsh. Surfaces such as polished mahogany offer the further problem of specular reflections.

A solution might be found by exploring the possibilities of indirect lighting from pendants or standards with very subdued visible luminous surfaces, or alternatively direct lighting from ceiling fixtures of appropriate design.

Buildings with electric light already installed but of obsolete

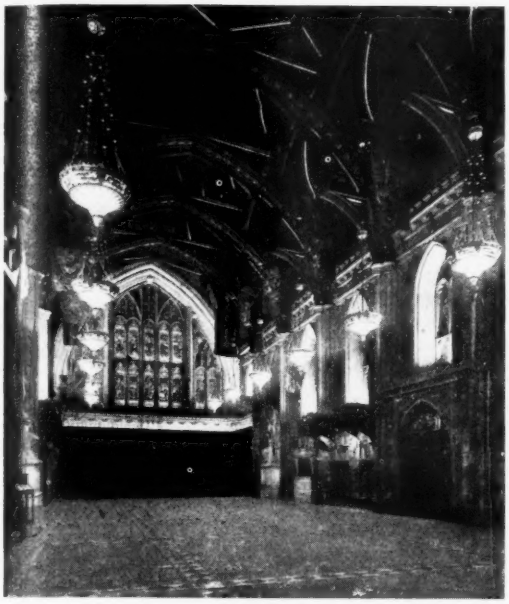


FIG. 1.—*Guildhall, London. Existing fittings adapted in a historic building*

character give much wider scope for original treatment and the application of modern light sources. Much misunderstanding and dissatisfaction is caused by the rash and thoughtless recommendation and use of innovations such as fluorescent lamps. There is nothing more likely to create prejudice against them than to misapply them, but with careful discrimination they lend themselves to the solution of many lighting problems where the point light sources of tungsten lamps would be unsatisfactory and often uneconomical.

Their chief characteristic is that they provide an initial light source of large area and low surface brightness. They lend themselves most readily to linear effects but can also be grouped together to localise the light source. They are indispensable where colour discrimination is necessary but, whatever colour of lamp is used, they provide a soft and relatively shadowless effect.

Tungsten lamps cannot be dispensed with where accurate and concentrated light control is necessary, or where a concentration of illumination is required from a single light source of limited size. The type of lamp to be used for each installation must therefore be determined by local conditions. These include the nature of the work to be carried out in each room, for instance clerical work, display of goods, varying reaction of goods displayed to the quality of light and other similar considerations. All these factors stress the fact that illumination practice is not limited to a stereotyped application of standard lighting equipment.

Of the many possible alternative methods of treatment the following are typical :—

1. Adaptation of existing fittings.
2. Design of new fittings in appropriate style.
3. Straightforward use of modern methods and equipment.
4. Supplementing existing lighting from concealed sources.
5. Fittings built into or externally applied to the structure.

The London Guildhall (Fig. 1) furnished a practical application of the adaptation of existing fittings in an old building of historic interest.

The old fittings were progressively converted from fishtail flame gas burners to electric light using carbon lamps, then gas-filled lamps, and were finally reconstructed to provide a semi-indirect lighting system utilising high wattage gas-filled lamps which materially increased the intensity of illumination and at

FIG. 2.—*Modernisation of existing fittings in a restaurant.*

the same time revealed the fine architectural features of the room without destroying its traditional character. It is to be regretted that this beautiful interior was destroyed during the war.

In contrast to this, Fullers' Restaurant in Regent Street (Fig. 2), although not an old building, comes under the category of old buildings of later period requiring modern standards of illumination. The wrought iron pendants as originally designed were equipped with the old type electric candle tubes. To convert these fittings into units providing modern standards of illumination the old candle fitments were removed and 60 watt tungsten lamps were fitted into the sockets and masked by celoid shades with flashed opal glass discs at the bottom.

In addition a glazed centre fitting was designed and fixed to the existing corona band by means of short brackets and equipped with the necessary tungsten lamps to bring the illumination up to the required standard.

In another instance a new fitting in appropriate style to replace existing fittings was required without making any alteration to the wiring system. The specified request was for a fitting to provide two standards of illumination (1) for general lighting in the interior of the order of seven lumens per square foot and (2) additional auxiliary lighting to increase the order of illumination to fourteen lumens per square foot on a horizontal plane 3 ft. above floor level.

The scheme was based on the installation of decorative lanterns each arranged to take eight 4 ft. fluorescent lamps for general lighting, and one 300 or 500 watt tungsten lamp, the latter being on a separate circuit and mounted with a reflector in the bottom of the lantern.

An example of the straightforward use of modern methods of lighting and equipment is provided by the main entrance showroom at Messrs. Warings premises (Fig. 3) in Oxford Street. In this instance it was necessary to provide illumination of a quality approximating to daylight to give proper colour values to the goods displayed. For æsthetic reasons the visual effect of the lighting fixtures was required in a warmer tone than that provided by daylight lamps. This combined effect was obtained by using vertical louvres of pink tinted flashed opal glass between each lamp which masked the lamps from the line of vision but allowed the light from the lamps to fall directly on the goods displayed.

The Rotunda on the fourth floor of these premises provides an example of the straightforward application of standard cold cathode fluorescent tube units to the existing structural form of the ceiling.

The practice of supplementing existing lighting from concealed sources is one which is mainly dependant on the archi-

Fig. 3.—An example of modern display lighting.

tectural treatment of the interior. The dining hall at The Royal Naval College, Dartmouth, provides an excellent opportunity of applying this principle. The existing fittings are those originally installed in the room and are highly valued by the College for their traditional associations. They were originally equipped with carbon lamps in small glass shades and are unsuitable for high wattage lamps.

The barrel ceiling provides an ideal medium for indirect lighting and the cornice surmounting the panelling on the walls lends itself to the concealment of specially designed fluorescent lamp units as the light source. Experiments revealed the fact that with the lamps fixed on the wall surface, the light emitted upwards vertically above the lamps emphasised to an unwelcome degree the irregularities of the plaster ceiling. To overcome this objection it was agreed to cut a shallow channel in the walls to permit the lamps to be recessed behind the wall face and a specially designed reflector was incorporated to concentrate the light on the opposite half of the barrel ceiling. It was proposed to retain the original fittings equipped with low wattage lamps to create the impression that they were the source of the illumination.

As an example of the principle of applying a modern lighting unit to the existing structure of a room, Fig. 4 illustrates an existing installation. Glazed cornices containing 5 ft. fluorescent lamps are fixed each side of the existing beams and the necessary control gear is housed in the box in the centre which was specially designed to harmonise with decorative treatment of the beams. It should be stated, however, that these boxes could now be dispensed with by using the long type chokes and capacitors.

The use of fluorescent lamps in groups (Fig. 5) is demonstrated by the scheme of lighting adopted in the Standard Bank of South Africa. With the continuous cornice lighting round the light well it forms a pleasing and efficient combination, which in principle lends itself to a like application for the relighting of other interiors of similar character.

Domestic Lighting

The demand for fluorescent lamp fittings for private house lighting is ample evidence of the public interest displayed in installing modern standards of illumination. Very few installations have been carried out owing to the limitation of supplies but much preliminary work has been done in the preparation of suitable designs for this purpose. Unmasked lamps on plain white enamelled channels have proved very satisfactory for lighting kitchens and bathrooms but in the living rooms there is every indication that lamps masked with a diffusing screen are more suitable.

Fig. 4.—Fluorescent tube in glazed cornices.

Much care and ingenuity will be necessary in designing fluorescent fittings for private house lighting, the principal factor being ease of maintenance. Under existing conditions their application is somewhat restricted owing to the sizes of the lamps being limited to 5 ft. and 4 ft. lengths, but when shorter lengths are available this form of lighting can be much more extensively applied.

Conclusion

The foregoing examples have been selected to give a general survey of the variety of lighting problems which are likely to be met under circumstances covered by the title of this paper. Yet they only touch the fringe of the subject.

Some of them are theoretical for the reason that existing conditions impose a limit to the possibilities of completing new installations, but we trust that the revelation of the direction in which ideas for the application of these new light sources are tending, and of the constructional details and technical information relating to them will provoke a desire to conceive more ambitious and original schemes for providing New Lighting for Old Buildings.

DISCUSSION

Dr. S. English said they had listened to a very timely paper. Firstly, it dealt with the re-lighting of old buildings, and it seemed likely that that would be the only lighting they would be doing for many years. Secondly, it had gone into detail, showing how co-operation between architect and illuminating engineer could work out in practice.

As Mr. Dow had mentioned, there had been several meetings with architects, but he had the feeling that quite a few architects were still shy of asking for help. He thought it might be due to the fact that architects and engineers looked at things—including the re-lighting of old buildings—from very different points of view. The architect looked at it from the point of view of trying to achieve the definite result of a picture he had in his mind. The illuminating engineer looked on it as a technical job. The illuminating engineer had set up what he called standards. The architect might say he had set up false gods. The illuminating engineer, on the other hand, would

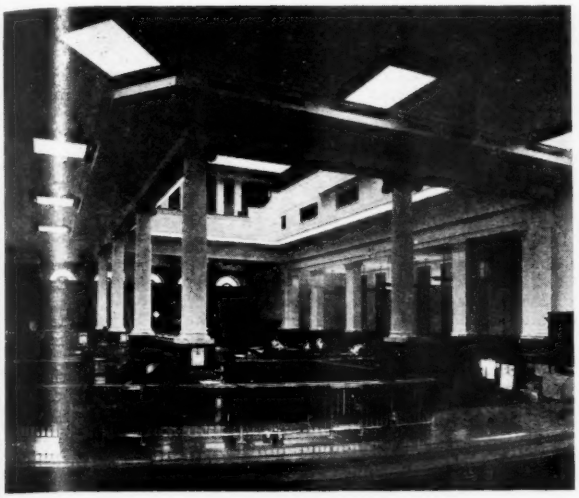
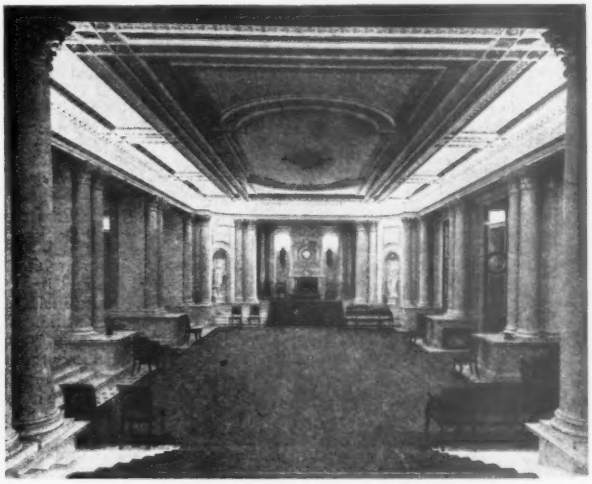


Fig. 5. Fluorescent lamps used in groups in a bank.



Cornice lighting in the Grand Hall, Buckingham Palace.

say the architect had tried to get a certain picture in his lighting, had set up standards which were false gods, too; and then where were they? When the illuminating engineer asked for well-diffused uniform lighting, with a minimum of shadows, the architect replied that he wanted a certain degree of contrast, because it was only thus that a proper idea of contour could be obtained.

Some years ago, in connection with the lighting of a new cathedral, the architect had wanted the altar and carved woodwork to form a picture in the eyes and in the mind of the congregation. Therefore he wanted accented lighting over that area, directionally, to make the carved work stand out in relief, and he wanted that lit to a higher intensity than the choir stalls and the cathedral, and nothing bright between the congregation and the altar. The architect achieved a beautiful picture that anybody going into that cathedral for a service would carry away with him. If that problem had been given to an illuminating engineer Dr. English was sure he would not have provided so satisfactory a job, though possibly it would have been more efficient from the purely technical point of view.

He also knew of a small early Norman church where, separating the nave from the choir, there was a beautiful Norman arch, and beyond that, the altar. In the re-lighting of that church, the fittings in the choir and the altar had been fitted with pale amber coloured screens. The result was that the altar and its golden furnishings stood out in a soft golden light, quite distinct from the general lighting of the nave of the church.

Mr. E. B. Sawyer said that years ago, when they had tungsten filament lamps, there was warmth to the lamp. When that was superseded by the gas-filled lamp, the coldness was objected to, and it was usual to use straw-coloured glasses, for instance, in church lighting. With the daylight fluorescent lamp it was possible that, taking the value at 100 per cent., to get a colour equivalent it would be necessary to use 850 per cent. tungsten light to get the same colour rendering, which would be a terrific increase in efficiency.

On the question of the tungsten filament lamp, a mention had been made of brightness of 5 candles per sq. in. when at an angle of 20 degrees from the normal line of sight. He thought that was dreadful. He would like to suggest that it did not depend entirely on the angle, but a light source at an of 20 degrees would not be good lighting.

There was another point in connection with fluorescent lamps: if daylight lamps were used and the illumination was low, it was not a good type of light source. The warm white lamp was thought good because you could go to sleep in the light provided.

He did not agree with the authors on one other point in connection with the use of methods of treatment. The paper said " the chief problem likely to present itself in historical buildings is one of brightness contrast. The walls are usually very dark. . . ." He wondered why the lecturers had picked out dark walls, because old buildings usually had high ceilings. He remembered some problems where there was hardly room for one to walk through the room without bumping one's hat on the beams. Their solution of indirect lighting for rooms with dark walls did not work, because you destroyed the brightness harmonies required to be used in good lighting arrangements. He also thought that some of the illustrations put on the screen were intended to show how good lighting had been substituted for bad, but in some cases, he thought they had been put there to show that here the lighting man could collaborate with the architect and put good lighting in.

Mr. Alister MacDonald said he thought it possible that lighting was not something which was applied to a building ; it grew out of the building. These old fittings, the beautiful candelabra, even the ones in the Guildhall that used to have gas jets in them, had been designed—even if one disagreed with the detail of the design—rather as part of the building, and to be a sort of flower in it. You could not say that chokes and straight lines were necessarily part of the building.

Whilst he had been prepared a short while ago to think that the new types of lighting were good for old buildings—he frankly admitted he was just beginning to wonder, after seeing these examples, whether we should not keep this type of thing for newly designed buildings: and if one wanted to put better light into old buildings one should use as much reflected light as possible. He was beginning to appreciate the true value of the reflected surface and reflected light. A little mirror here and there would produce illumination as required.

He felt that if they were going to re-illuminate old buildings, they should not bring too much of the new type of fitting into old buildings, or certainly not obviously. Let them rather use scientific ingenuity to bring in new sources of light and throw it round the place on to the spots where they wished it concentrated, by reflectors, and not by chokes and straight lines.

Mr. J. C. Lowson said he endorsed Mr. MacDonald's remarks, except that old buildings should be in semi-darkness anyway. Anyone who had seen the lighting of the Royal Society building would find a nice blend of the old type of architecture with the newer fluorescent lighting. He thought Mr. MacDonald had treated chokes rather severely; the slimmer gear now available would get over that objection, as the engineers had pointed out. Much harm had been done to flourescent lighting by inexpert application of it in public places such as shops.

Mr. W. E. Rawson-Bottom said that the Ministry of Works was responsible for a large number of important buildings in the country. Each building was a special study in itself, presenting different problems —different exhibits in the museums and different types of architecture to be dealt with. They had rather a ponderous way of dealing with it—the initial survey, discussion with the governing bodies and taking their requirements, discussions with curators of museums and art galleries, who had their own ideas, as well as the architects concerned, and then there were the installation and maintenance difficulties which had already been mentioned. The Ministry of Works, however, was continually abreast of modern methods, and lighting development was part of the Ministry's organisation. Like others, however, they were limited by the present supply position and other very important priority work.

BOOK REVIEWS

Survey before Plan series. The Hub of the House. Edited by E. M. Willis. 4to. pp. 64. London: Lund Humphries & Co. 1946. Price 6s.

This slim book sets out the housewife's requirements in connection with cooking and cleaning, if her life is to be made bearable; problems of the kitchen in the town house, of cleaning in the town house, and of the country house, all receive detailed analysis.

T. Sumner Smith: Building Specifications. 4to. pp. 192. London: Hutchinson's Scientific and Technical Publications. London. 1946. Price 16s.

This book, which should be of considerable assistance to architects embarking upon practice, describes how a specification should be put together to be comprehensive yet concise. Sections are also included on Reports and on combined specifications and bills of quantities.

L. Dudley Stamp: Britain's Structure and Scenery. 4to. pp. xvi + 255. 47 colour and 40 black and white photographs, 74 maps and diagrams. London: Collins. 1946. Price 16s.

This book deals with the physical background of life in this country. It describes the appearance of the various regions and why they have acquired their character, which in turn has influenced expression in building. Thus, if only indirectly, the book should be of considerable interest to architects.

W. H. Maxwell: Current Waterworks Practice. 4to. pp. viii + 254. London: B. T. Batsford, Ltd. 1946. Price 18s.

The need for an adequate and wholesome water supply to every home is self-evident. This book tackles the problem of how it is to be achieved in practice, giving useful information on water sources, motors, the effect of aerial warfare, constructional works, purification and not least a National water policy.

Piero Bianconi: Tessiner Kapellen. 4to. pp. 40. Basel: Urs Graf. 1944. Price £1 1s.

Few can study this book without a feeling of nostalgia. It describes the wayside chapels and shrines in the part of Switzerland that adjoins Northern Italy, where æsthetically the dividing line between the two is not strongly marked. The text is illustrated with many beautiful photographs, some of them reproduced in colour, showing great variety of type, many decorated with frescoes of a high order. Here in Switzerland they have remained safe. Across the border in Italy, similar shrines have suffered much from the war; both from dirt, as they are difficult to protect if they are to remain visible, and from the ravages of passing army trucks. This book will open the eyes of many to the value of these small but important works of art.

Interim Memorandum on District Heating. Department of Scientific and Industrial Research. 4to. pp. 9. London: H.M.S.O. 1946. Price 3d.

This is the first official pronouncement on the subject made by the District Heating Sub-Committee of the Heating and Ventilating (Reconstruction) Committee of the Building Research Board, and it is intended it will be followed by a more comprehensive report.

Experience gained abroad has shown that district heating can provide improvements in amenities and efficiency combined with appreciable saving in fuel. It is suggested that Thermal-electric schemes might be tried out in urban areas and housing estates in this country.

Building Quantities, by James H. Anderson. 4to. pp. vi + 208. London: Edward Arnold & Co. Price 7s. 6d.

This book has been written to meet the demand by students, working for examinations in architecture and building, for general information on the subject of preparing quantities: taking, abstracting and billing, of which type sheets are given in various examples.

Series of Publications from the Under-secretary's Office for Reconstruction, Athens, Greece. Nos. 1, 2, 3, 4, 6, 9, 10, 11, 14 and 15.

Copies of ten numbers of the Series of Publications from the Under-secretary's Office for Reconstruction on Reconstruction in Greece have been received as a gift from C. Biris, Director of the City Plan of Athens. An English translation for No. 3 on Economic Policy for the Reconstruction of the settlements of Greece by Constantine A. Doxiadis had been included, and it is understood that English synopsis of the other booklets will shortly be sent. These include much information of interest to English architects and town planners.

The Rehabilitation of Athens and its Suburbs (Piraeus-Eleusis-Megara-Pagae), by Costas E. Biris. 4to. pp. 30. Athens. 1946.

A copy of this book has been received from the author, who is Director of the City Plan of Athens. It deals with communications, location of industry, the administration and military centres, planning to relieve congestion and also to recover and display the ancient city, public parks and finance. An English synopsis is included, illustrated with coloured maps.

Electric Wiring, Theory and Practice. 8th edition. Revised by W. S. Ibbetson, B.Sc., A.M.I.E.E., M.I. Mar.E. Cr. 8vo. 272 pp. 136 illustrations. E. & F. N. Spon, Ltd. 1946. 10s. net.

Electrical Technology for Beginners. 2nd edition. By G. W. Stubbings, B.Sc., F.Inst.P., A.M.I.E.E. Cr. 8vo. 156 pp. E. & F. N. Spon, Ltd. 1946. 6s. 6d. net.

Dictionary of Electrical Engineering, by G. W. Stubbings, B.Sc., F.Inst.P., A.M.I.E.E. Cr. 8vo. 323 pp. 64 illustrations. E. & F.N. Spon, Ltd. 1945. 10s. 6d. net.

The first book is a revised edition, bringing up to date the various sections covering theory, fittings, wiring, testing, illuminations, motors and small generating plants.

The second is a simple non-mathematical text book for the use of students up to matriculation standard, explaining in simple terms the supply and utilisation of electricity.

The third book contains definitions and explanations of the more important technical terms relating to the theory and practice of heavy electrical engineering.

Architects', Builders' and Civil Engineers' Technical Catalogue. An Encyclopædia of Technical Information and Sources of Supply. F. E. Drury and others, editors. 736 pp. Published by Country Life, Ltd. 1946. 45s. net.

Technical data is given on constructional materials and processes, special forms of construction, constructional plant and equipment and engineering services. Special articles are included on the post-war building programme as it affects the architect, collaboration between architect and engineer, codes of practice and standard specifications, possibilities of plastics in building and how to use the Building Centre.

Lifts, by L. W. Honey (Assoc. I.E.E.). 4to. 223 pp. London: Marryat & Scott, Ltd. 1946. n.p.

This book is published for distribution to *bona-fide* practising architects, surveyors and consulting engineers. Trade matters are, however, confined to some twenty-five pages at the end. The main part of the book gives valuable lift data of a general nature, including legislation and recommendations for lift design and installation, British Standard specifications, Institution of Electrical Engineers' regulations, loads, tabulated information on the Electricity Supply Undertakings in Northern Ireland and Eire, and details of hand-operated lifts.

Reinforced Concrete Design, by Thomas J. Bray. 4to. pp. viii + 216 + 25 charts and graphs. London: Chapman & Hall. Price 25s.

REVIEWED BY EDRIC NEEL [*A.*]

This book is an excellent and compact statement of the principles underlying the design of reinforced concrete members and the application of these principles to structures. The book covers most adequately all that the student needs to know of reinforced concrete for the R.I.B.A. Final Examination.

The book opens with the necessary data upon design loads and upon the general theory of stress distribution. It then proceeds briefly and forthrightly to deal with slabs, continuous and otherwise, spanning in one direction or two, and so through the mysteries of shear to the column, the foundation, the retaining wall and the staircase. The text is interspersed with many tables and diagrams. Most of the diagrams are clearly drawn and easily understood, chiefly because the stencilled rather than the handwritten word or figure has prevailed. The tables and the more complex diagrams are less fortunate. Clear legible stencil has yielded to script.

Apart from this one small criticism, the book can be highly recommended.

Glass: The Miracle Maker, by C. J. Phillips. 4to. pp. xii + 424. London: Sir Isaac Pitman & Sons. Price 21s.

Few books have been published on the historical and technical sides of glass-making, together with the application and potentialities of this material in building and illumination. This work, coming from America, gives much useful information on the subject.

Bauliche Sanierung von Hotels und Kurorten. Assainissement Technique d'Hotels et de Stations Touristiques, by A. Meili. 232 pp. —31 plans. Zurich. Erlenbach. 1945.

This book gives detailed information about Swiss tourist resorts, their history, lay-out, hotels and sanatoria. Plan references are listed in English as well as German and French.

Timber Preservation. sm. 8to. pp. 46. Published by the Timber Development Association. London. 1946. n.p.

Concise information on wood preservation, including types of preservatives available and their methods of application, together with notes on the appropriate use of both, are given in the new red booklet, *Timber Preservation*, just published by the Timber Development Association. Current shortage of material makes this subject one of particular importance.

Reinforced Concrete for Buildings and Structures. Report on Formulæ for Computation of Stresses. sm. 8vo. pp. 26. Published by the Institution of Structural Engineers. London. 1946. Price 1s.

The object of this report has been to collect together those formulæ in most common use and to incorporate the Institution's standard notation, which it is recommended should be generally adopted. It is described as neither a textbook on design nor a complete set of formulæ, but should be treated as a basis for reinforced concrete design. Formulæ are set out under the following headings: Slabs and rectangular beams, T-beams and L-beams, shear and bond stress, columns and filler concrete slabs.

Oxford Pamphlets on Indian Affairs No. 35. Architecture. Claude Batley. sm. 8vo. pp. 32. Madras: Geoffrey Cumberlege, O.U.P. 1946. Price 9d.

Many modern buildings to be found in India are in fact exotics, unsuitable to the climate with its often vertical sunlight and its monsoon winds and rains. In this pamphlet the author, with a wide knowledge of the problems to be solved, stresses the importance of analysing past styles in order to relate modern designs to local conditions and needs, and at the same time remedy the defects of planning brought about since the Industrial Revolution.

Building Geometry, by W. J. Stone. Building Craft Series. 4to. pp. 213, with 430 diagrams. London: Longmans, Green & Co. 1946. Price 7s. 6d.

This volume forms an addition to the Building Craft series and is primarily for students. Assuming an elementary knowledge on geometry, it aims to cover fully the subject which concerns the builder: "plane" and "solid" geometry rather than the "deductive" side, which is the field of the pure mathematician. The earlier chapters on projections, planes, solids, conics, etc., lead to their application in setting out arch intersections, mouldings, raking moulds, bevelled work, stairs and handrailing, the grasp of which forms an excellent training in three-dimensional thinking.

Pampulha [New Town near Belo Horizonte]. ob. 14½ × 11. pp. 62 text illus. Imprensa Nacional, Rio de Janeiro, Brasil. 1944.

REVIEWED BY S. H. LOWETH [*F.*]

This book contains the plans and pictures of the buildings erected in the small town of Pampulha near Belo Horizonte (the geographical centre of the rich State of Minas Gerais) by that famous young Brazilian architect, Oscar Niemeyer Soares, the designer of the well-known building for the Ministry of Education and Health in Rio, and of many other remarkable buildings in that city and elsewhere in Brazil.

The illustrations are so complete that the prefaces written by Soares, Philip Goodman, the American architect, and Snr. J. K. de Oliviera (the Mayor of Belo Horizonte), render it unnecessary to repeat the descriptions of these buildings in words.

Pampulha is unique that it "started from scratch," as did Canberra, New Delhi and Stalingrad. It is an example of enterprise allied to expert design.

A plan of the city was made and these buildings erected before the factories and crowds became overpowering. With the encouragement of a progressive government, interested Governor of the State and an enlightened Mayor, one of the ablest and most versatile of the younger Brazilian architects was employed to design a number of new buildings, large and small, as signposts for the development of the town.

It was the intention of the architect when he designed these buildings that they should be, as far as possible, an expression of contemporary art and technique, and to this end ferro concrete was used extensively as it afforded the greatest malleability, opening up a huge field of plastic possibilities unlimited by any obligations to the past.

This movement was influenced in its embryo stage by the visit to Brazil of Le Corbusier some years ago. His well-known theories of design and constructions (greatly aided by the local conditions) proved particularly attractive to the School of young Brazilian Architects.

The design of these buildings in Pampulha leads to the conclusion that a new architectural era is in formation in our time, a period which will represent a high level of constructional technique, marking the beginning of an epoch of design based on intelligent fitness for purpose, as enduring and as pure as that of the Greeks.

The Art of Architecture, by Professor A. E. Richardson and Prof. Hector O. Corfiato. Revised edition. 8vo. xxiv + 662 pp. London: English Universities Press, 1946.

REVIEWED BY MISS E. CALDICOTT

This book originally appeared in 1938 and was reviewed at length in the JOURNAL for 21 November in that year. Two hundred and fifty-six pages are devoted to the history of architecture and eighty-seven to "Decorative Composition"—a rather vague title for what is really an essay on interior decoration. The words "revised edition" sent the reviewer hunting for the revisions and then for the definition of those words in the dictionary. Webster says:—"in editions after the first, additions or alterations of the text are made or the type reset; a second or succeeding *impression* (the italics are the reviewer's), is from the unaltered original plates."

After a careful comparison of the revised edition with the first, it was only possible to find the following alterations:—(1) misprints or mis-spellings corrected in the index and (2) the omission of the footnote on page 139. Now when a librarian sees that there is a new or revised edition of an authoritative book, he is naturally tempted to buy it, and may accept the fact that it is revised without making very careful comparison with the original. The need to clarify what is implied by the words edition, imprint, revision and impression, is thus once again apparent.

There is little to add about this book, except that the plates have deteriorated.

Lord Shrewsbury, Pugin and the Catholic Revival, by Denis Gwynn. 1946. 4to. 156 pp. 1 illus. London: Hollis & Carter. 10s. 6d.

REVIEWED BY W. W. BEGLEY

"Rome is certainly a miserable place, quite disgusting and depressing; but Italy is yet the richest country for true Christian art; and I do not despair of St. Peter's being rebuilt in better style." A. W. N. Pugin wrote this in 1847, at the age of 35 and, although his reputation as an architect was established, one can hardly be surprised at the immediate counter thrusts by members of his own faith. The far-sighted Cardinal Newman wrote to Ambrose Phillips de Lisle: "Mr. Pugin is a man of genius; I have the greatest admiration of his talents . . . His zeal, his innate diligence, his resources, his invention, his imagination, his sagacity in research, are all of the highest order . . . But he has the great fault of the man of genius, as well as the merit. He is intolerant, and if I might use a strong word, a bigot. He sees nothing good in any school of Christian art except that of which he is himself so great an ornament. The canons of Gothic architecture are to him points of faith, and everyone is a heretic who would venture to question them." Cardinal Wiseman, referring to his own novel "Fabiola" said: "It had one good effect. It is undoing some of the mediæval frost-work which late years have deposited round English Catholic affections to the forgetfulness of Rome and its primeval glories." This book gives valuable information on the friends, Pugin and Ambrose Phillips, and John, sixteenth Earl of Shrewsbury, who affords a belated example of the noble patron. From the purely architectural point of view Trappes-Lomax's book will continue to hold the field, for the outstanding interest of this one is to the social historian, as illustrating the difficulty, perhaps impossibility, of getting "under the skin" of our forbears. Pugin and Phillips, with their fiery crusade for revived mediævalism, fit incongruously into the broad panorama of the England of the "railway mania," producing overflowing quantities of crude, vulgar goods for the Great Exhibition; an expanding world looking confidently to the future and with little time for backward glances.

The writings of the Revival wear worse than the buildings. To revisit a Pugin church is to restore the old allure. What visions the names alone call up: St. Mary, Derby; St. Alban, Macclesfield; St. Mary and St. Oswald, Liverpool; St. Wilfrid, Hulme, Manchester; St. Barnabas, Nottingham; St. John's Hospital, Alton; St. Giles, Cheadle; St. Chad, Birmingham; St. George, Southwark; and St. Augustine, Ramsgate; and these are but a few of the many works which caused their author to say, "I have done the work of a hundred years in forty, and it has worn me out."

Pugin's hatred of the renaissance and his exclusive advocacy of the gothic should not blind us to the essential modernity of his outlook. To him the mediæval tree was still capable of flowering and not merely a picturesque trunk.

To-Morrow's House, by George Nelson and Henry Wright. Large 4to., pp. 214. London and New York: The Architectural Press and Simon & Schuster. Price 15s.

An English edition of this American book, which was reviewed by Professor Basil Ward in the R.I.B.A. JOURNAL in June 1946, has now been published in this country. The production remains unaltered.

PRACTICE NOTES

EDITED BY CHARLES WOODWARD [A.]

IN PARLIAMENT

Requisitioned Premises (Compensation)

Asked whether he was aware that the War Office Lands Branch had recently offered a Huddersfield owner a price of 1s. 3d. per yard super for putting distemper on the walls, whereas the owner's surveyor estimated the cost at 1s. 9d. per yard super and the contractor had tendered 2s. 3d.; and if he will state the basis on which the branch works out its offers of compensation to owners of properties now being derequisitioned, the Secretary of State for War replied: I will make inquiries if my hon. Friend will let me know to which property he is referring. On the general question raised in the last part of his Question, the War Department liability under Section 2 (1) (*b*) of the Compensation (Defence) Act does not necessarily extend to the full cost of the reinstatement ordered by the claimant but is estimated with reference to such factors as the condition of the property when requisitioned, and in particular the extent to which the normal life of the decorations, repairs, etc., had expired at the date of requisition. In short the claimant is only entitled to the cost, at the date of derequisition, of making good the damage occurring during, and not before, the military occupation. (5 November 1946.)

War Damage Payments (Deteriorated Property)

Asked whether he was aware that many properties damaged by enemy action have suffered from deterioration and looting during war-time to such an extent that they are now beyond repair; and whether he will, in suitable cases, authorise a value payment instead of a cost of works payment, the Financial Secretary to the Treasury replied: Where deterioration causes war-damaged property to become a total loss a value payment, and not a cost of works payment, will be payable, but may be reduced because of the owner's neglect. Damage caused by looting is not war damage, but if as a result of looting it becomes impossible to make good the war damage a value payment will be payable. (26 November 1946.)

War Damage Commission

Asked whether his attention had been called to the observations of the Honourable Mr. Justice Vaisey *in re* 36, 38, 40 and 42 Jamaica Street, Stepney; and whether, in view of the learned Judge's statement the amending legislation would be necessary in order to correct previous wrong decisions of the War Damage Commission, it is the intention of the Government to introduce that legislation at an early date, the Chancellor of the Exchequer replied: Yes, Sir. I do not read the learned Judge's remarks as the hon. Member does, but, since this case may be taken to a higher court, I should prefer not to make further comment. (28 November 1946.)

Note. The Judgment in the case referred to in the Question is quoted later in these Practice Notes.

Housing (Rural Areas)

Asked whether, in view of the fact that the Minister of Health had recently made drastic cuts in the housing programmes in rural areas, and that a contract had been let by the Secretary of State for Air to a London firm of builders, without local labour, to build 50 houses in connection with Lyneham, Wiltshire, aerodrome, at a cost of £1,500 each, he will take further steps to co-ordinate the Government's housing programme, particularly in rural areas, Mr. H. Morrison on behalf of the Prime Minister replied: I have been asked to reply. It is not the fact that my right hon. Friend the Minister of Health has recently made drastic cuts in the housing programmes in rural areas. The contract mentioned was let by my right hon. Friend the Secretary of State for Air, after consultation between the two Departments, in accordance with the usual practice. All practicable steps are being and will be taken to co-ordinate the Government's housing programme.

Asked further whether the housing authorities in the districts had any notice of this project, which will certainly prejudice their own housing schemes, which have already been reduced, Mr. Morrison replied: I do not see why this should prejudice their own housing schemes. It was a necessary operation on behalf of one of the Defence Departments, which had to proceed. The housing operations of the local authorities are not prejudiced. (3 December 1946.)

Building Licences

Asked if he would give an assurance that the local authority concerned is always consulted before the issue of building licences by his regional departments, the Minister of Works replied: The local authority is always consulted before the issue of any licence relating to housing work, and in any other case where it is in a position to give useful advice. But in cases involving national considerations, or in exceptional circumstances, I must reserve the right to grant licences without such consultation.

Asked further whether the procedure applied to cases where the local authorities turn down an application which the regional people review and grant what is required, the Minister replied: No, Sir, it does not refer to that. Steps are now being taken to make that impossible. (9 December 1946.)

War Damage Value Payments

Asked when he proposes to make payment of value payments under the War Damage Act; and whether he is prepared to increase their amount, in view of the change of values since 1939, the Chancellor of the Exchequer replied: I propose that value payments under the War Damage Act should be made in the course of next year. I have so informed the War Damage Commission, and have requested it to consider urgently, under Section 11 of the Act, whether there should be an increase in these payments. (10 December 1946.)

Note. The Government have already stated that if under Section 11 an adjustment order is made, the operation of the order will be retrospective.

Housing. Steel Window Frames

Asked if contracts have now been placed with firms of Dutch contractors for the manufacture of steel window frames, the Minister of Works replied: No, Sir. Asked further whether he denied that negotiations have been going on with Dutch constructors for the manufacture of steel windows from steel exported from this country, the Minister replied: No, Sir. (16 December 1946.)

Steel Houses

Asked whether any decision had yet been taken with regard to the production of the two-storey steel house, the Minister of Health replied: I regret that owing to the shortage of steel it will not be possible at present to proceed with the pressed steel two-storey house. (16 December 1946.)

MINISTRY OF HEALTH CIRCULARS

216/46. 25.11.46. This Circular refers to work which may be carried out without a licence in cases where the person carrying out the work receives no payment, and the materials used by that person are disregarded so far as cost is concerned. The Circular points out that such work may be carried out within the four walls of a house without a licence, but all other work is licensable. For the erection of a garage, coal shed, lean-to-shed, greenhouse, boundary wall or fence, the person must obtain a licence if the value of the work under present regulations requires a licence, and local authorities are informed by this Circular that such licences should not normally be issued.

223/46. 3.12.46. A leaflet has been prepared by the Minister giving the reasons for the present licensing restrictions, and has been sent to Housing Authorities for distribution when applications are rejected.

MINISTRY OF WORKS

A statement by the Ministry of Works on the subject of Price Control of Building Materials and Components has been circulated to members of the National Consultative Council for their information. It can be obtained at H.M. Stationary Office, price 1d.

MINISTRY OF TOWN AND COUNTRY PLANNING

Circular No. 28 dated 30 November has been issued by the Ministry, addressed to Local Planning Authorities, referring to applications for permission to carry out private development on agricultural land.

The Circular indicates the points that should be borne in mind by Planning Authorities when dealing with such applications. It can be obtained at H.M. Stationery Office, price 1d.

The Report of the Advisory Committee on London Regional Planning has now been issued and can be obtained at H.M. Stationery Office, price 2s. 6d. (2s. 8d. by post).

MINISTRY OF LABOUR AND NATIONAL SERVICE

The Ministry has informed organisations representing employers and workers that the Building and Civil Engineering Industries will be withdrawn from the scope of the Essential Work Orders about 31 March next. At least one month's notice will be given of de-

scheduling and meantime the provisions of the Orders will remain in force on scheduled sites and undertakings.

MINISTRY OF EDUCATION

The Report of the Committee on School Sites and Buildings Procedure has now been issued and can be obtained at H.M. Stationery Office, price 4d, (5d. by post).

POST-WAR BUILDING STUDIES, NO 20

Part I of the report of a Joint Committee of the Building Research Board and the Fire Offices' Committee has now been issued and contains General Principles and Structural Precautions. It can be obtained from H.M. Stationery Office, price 1s. 6d. (by post 1s. 9d.).

R.I.B.A. STANDARD FORM OF BUILDING CONTRACT FOR THE USE OF LOCAL AUTHORITIES

The following practice notes are issued by the Joint Contracts Tribunal :—

(1) Clause 24 (*b*) of the R.I.B.A. 1945 Standard Form of Contract specially adapted for the use of local authorities reads as follows :—

" The amount so due shall . . . be the total value of the work properly executed and of the materials and goods delivered upon the site for use in the Works . . . less the amount to be retained by the Employer (as hereinafter provided) and less any instalments previously paid under this clause. Provided that such certificate shall only include *the percentage named in the appendix to these Conditions* of the value of the said materials and goods as and when . . . etc."

The question submitted to the Tribunal was whether the amount included in an interim certificate in respect of the value of materials and goods on the site (which amount would only be the percentage named in the appendix of the total value of such materials and goods) should be subject to retention.

The Tribunal are of the opinion that, as a matter of practice, the amount included in an interim certificate in respect of the value of materials and goods on the site should not be subject to retention. They are of the opinion that the " Percentage of value of materials and goods to be certified " included in the Appendix should be regarded (so far as materials and goods on the site were concerned) as being in lieu of the Percentage of Certified Value Retained.

This practice note does not apply to the R.I.B.A. Standard Form of Contract for general use, where the words *in italics* above do not appear.

(2) In reference to Clause 25A of the R.I.B.A. 1945 Standard Form of Contract, the question submitted to the Tribunal was whether payments which are reimbursable to the Contractor under the Fluctuation provision, when included in an interim certificate, should be subject to retention by the Employer under Clause 24 (*c*).

The Tribunal noted that by clause 24 (*a*) provision is made for the Architect at the Period of Interim Certificates to make interim valuations. Such valuations should be made upon the basis of the prices of the Bills of Quantities. By Clause 24 (*b*) the amount due to the Contractor to be included in the interim certificate is " the total value of the work properly executed and of the materials and goods delivered upon the site," that is to say the result of the valuation referred to in Clause 24 (*a*). By Clause 24 (*c*) the retention money is to be the agreed percentage of the said value of the work and materials.

The Tribunal is of the opinion that any monies due to the Contractor under the fluctuation provisions Clause 25A should not be included in the valuation under Clause 24 (*a*) and therefore not subject to retention under Clause 24 (*c*).

LAW CASE

The following case is reproduced by the courtesy of the Editor of *The Estates Gazette* and the report appeared in the issue of that journal for 30 November 1946.

The facts of the case appear sufficiently from the Judgment.

CHANCERY DIVISION.

November 22.

(Before Mr. Justice Vaisey).

Re War Damage Payments in respect of 36, 38, 40 and 42 Jamaica Street, Stepney.

Brigadier. D. A. S. Browne *v.* War Damage Commission.

JUDGMENT.

Giving judgment, Mr. Justice Vaisey said that the houses were structurally damaged by the explosion of a bomb which fell on the opposite side of the street. The explosion seriously affected the stability of the front walls of the houses, which were old, and the front walls were in a bad condition, due mainly, it was said, to the inherent nature of the brickwork. The defects were so accentuated by blast effect that the front walls had to be rebuilt.

The appellant's contention was that the Commission should bear the whole cost of the works. The expression in the War Damage Act " direct result of action taken by the enemy," was very important, and on its true meaning the decision in this case might largely depend.

" I was invited by counsel for the Commission to dismiss this appeal on the ground that it involved no question of law, and that the determination sought to be appealed from was a finding of fact from which no appeal lies. In my judgment, no such easy way of disposing of the case is open to me. I think that it does turn on a question of law. This is, I believe, the first case of its kind, and there is no previous judicial pronouncement to guide me."

The contentions of the parties had been formulated in various ways, some of which were, in his lordship's judgment, untenable. The Commission wrote stating that their contention was that the rebuilding of the front walls of the houses was more than was necessary to reinstate the war damage, " particularly in view of the fact that the condition of the walls is not wholly the result of enemy action."

" To that way of putting it," continued the judge, " I would point out that, according to Section 8 of the Act, the war damage has not to be reinstated, but has to be made good by the reinstatement of the hereditament in its previous form, though not necessarily in its previous state. In the same letter the Commission disclaim, I think rightly, the contention that the appellant should contribute to the cost because he will have obtained ' betterment,' and it is now admitted that the substitution of new work for old is inevitable in practically every case and does not in itself give rise to a case for apportionment of cost of works.

" At the end of the hearing before me, counsel put the Commission's case in this way : ' If the unsoundness of the building was of such a character that the war damage was greater than it would have been if the building had previously been perfectly sound, the Commission should not be called upon to pay more towards the cost of reinstatement than they would have had to pay to reinstate a hypothetically sound building.'

" My difficulty in accepting that is two-fold. First, I cannot find that the Commission has ever applied any such formula to the present case, and secondly, that it would be impossible to apply it to any case without some sort of inquiry, which could rarely, if ever, be satisfactorily answered, for it is well known that a well-built, rigid structure may suffer greater damage from blast than an old building possessing qualities of suppleness, resilience and flexibility.

" In the present case three-quarters of two of the walls and the whole of the other two have had to be pulled down and rebuilt, and I cannot see how it could ever be known whether the same or a less amount of work would have had to be done if the four walls had been free from all structural defects just before the bomb exploded. There is no finding to the effect that the walls would have fallen down within any measurable distance of time if no enemy action had injured them. I think also that the damage done to them, necessitating the works of reinstatement, was the direct result of the explosion : that the explosion was, in other words, the proximate or immediate cause of the damage, and not merely a contributory cause acting in conjunction with the structural defects as another contributory cause, and that, even if those defects constituted a *causa sine qua non*, the enemy action was none the less the sole *causa proxima*, which is, to my mind, only another way of saying that the damage occurred as its direct result.

" The contentions of the parties seem to me to come to much the same thing. It was said on behalf of the Commission that they could not accept the contention that they were bound to repay the full cost of rebuilding a structure which was, in fact, defective before it sustained war damage. It was a question of fact in each case, to be decided by the judgment and good sense of the surveyors on both sides to decide how far the property was defective before the occurrence of the war damage, and to reach a fair settlement.

" As against this, the appellant said : ' The fact is that all this work was necessitated by bomb damage.'

" How fine the line dividing the rival contentions is appears very clearly from the concluding sentence of the statement of the case, in which the Commission state that they have never denied that, if the whole of the works had been necessary to make good war damage, the amount of the payment of cost of works which can be claimed by the appellant would not be liable to be reduced either by reason of the condition or age, or instability or weakness, of the front walls, or because the works had improved the hereditament, or because struc-

tural defects existing in the walls immediately before the occurrence of the war damage had incidentally been remedied by the execution of the works.

" I confess that I find it very difficult to reconcile the expressions of the sentence I have just quoted with the determination of the Commission, from which this appeal is brought. My own understanding of the Act is that there is war damage, and if works are thereby made necessary in order to reinstate the building in its pre-existing form the whole cost of such works must be borne by the Commission, and I can see no exception to, or qualification of, this proposition short of a case in which the building would, at the time of the war damage, have had to be reinstated—not repaired—in any case, as, for instance, where a chimney stack had, just previously to the occurrence of the war damage, been blown down (not merely weakened) by a gale.

" I have come to the conclusion that the view taken by the appellant is to be preferred to the view put forward on behalf of the Commission, and I propose to declare that the payment to be made is the whole cost of the works. I am not disposed to make a declaratory order in any general terms, but the decision in this case will presumably affect many other cases. If leave to appeal is required, I very willingly give it, for the matter is, in my judgment, one well meriting review by higher Courts, and possibly, if my decision is right, calling for some amending legislation, retrospective or otherwise. I must order the Commission to pay the costs of the present appeal."

CORRESPONDENCE

THE R.I.B.A. AS NEGOTIATING BODY

County Council of Middlesex,
County Architect's Department,
Westminster, S.W.1.
31 *December*, 1946.

To the Editor, THE JOURNAL, R.I.B.A.

SIR,—With reference to the paragraph on page 2 of the November issue of the R.I.B.A. JOURNAL headed " National Scales of Salaries," it may interest members of the Institute to hear of the action which has been taken by the staff of the County Architect's Department of the Middlesex County Council.

Prior to the issue of the November JOURNAL, a letter signed by 100 per cent. of the members of the R.I.B.A. (including students) in this office was sent to the Secretary, requesting the R.I.B.A. to seek powers to act as the sole negotiating body in respect of Scales of Salaries for their members in public employment.

Subsequent to that application, and following upon a meeting of the staff, a committee of five was elected to follow up the matter with the R.I.B.A. This committee is of the opinion that similar joint applications on behalf of members of the Institute on the staff of other local authorities would, at this juncture, be of considerable assistance to the Institute in their impending negotiations with the National Joint Council.

Yours faithfully,

S. M. EVANS, M.B.E. [*A.*]
JAMES H. DAVIDSON, Dip.Arch. [*A.*]
DAVID WILSON, B.A. [*A.*]
F. G. WEST [*A.*]
N. K. PURNELL [*S.*]
Members of the Committee.

Editor's Note.—This is the first collective request that the R.I.B.A. has received from the whole architectural staff of a local government authority. The Institute has, of course, for some time past been receiving a steady stream of similar requests from individuals and small groups.

A CAUTION TO ARCHITECTS

To the Editor, JOURNAL R.I.B.A.

SIR,—As a result of a recent prosecution and conviction of an architect for exceeding the amount of a building licence a very serious position has been created for the profession as a whole. Without going into full details of the case, the magistrates descision that he had exceeded the licence was based on the amount that the contractor had paid for wages and materials even though the value of the work done as certified by two quantity surveyors was considerably less than the builder's costs.

The result of this decision is that any architect who is supervising work for which a licence has been granted will be compelled, in his own interests, to check the amount of money being spent by the Contractor, irrespective of whether he has a priced shedule or not, almost from day to day during the whole time the job is proceeding, otherwise he renders himself liable to be prosecuted for exceeding the licence even though he has no actual control of the expenditure.

As this is a matter which should be brought to the notice of anyone who is responsible for building under the present regulations, I should be obliged if you would publish this letter with this end in view.

Yours truly,

MAURICE YENDALL [*L.*].

INTERNATIONAL STUDENTS' CONFERENCE, PRAGUE

To the Editor, JOURNAL R.I.B.A.

SIR,—In your November issue, " Schools and Students," page 45, the international students' conference in Prague is described as " ignored by the entire British press." It was not ignored by the *Manchester Guardian*, which published a short account of its proceedings on 29 August. This brief report did not, however, discuss the formation of the Architectural Section, of which I look forward to reading in your next issue.

Yours faithfully,

P. J. MONKHOUSE,
Assistant Editor, Manchester Guardian.

INTERNATIONAL REUNION OF ARCHITECTS

To the Editor, JOURNAL R.I.B.A.

SIR,—Will you grant me some of your valuable space to put before your readers the results of the first international conference of architects held since the war, which took place in London from 23 September to 28 September last year. The Conference took place at the invitation of the British Committee of the International Reunion of Architects. It had a two-fold aim, firstly, to deal with the routine business of the I.R.A., and, secondly, to explore the possibilities of transforming the International Reunion into a wider and more representative body which could speak for the architects of the world.

Both these aims have been fulfilled. The main items of routine business were the decision to hold the next full congress in a year's time, possibly in Switzerland, and to elect a new president in the person of Sir Patrick Abercrombie. The second aim was fulfilled in unanimously deciding to wind up the old I.R.A. and to lay the foundations of an International Union of Architects. A working committee was appointed to define the aims and to draw up the statutes of this organisation, which is to consist of two parts :—

1. An international assembly of architects, delegates of the participating countries, which is to elect a President and Honorary Secretary and an Executive Committee.

2. A permanent bureau under a full-time secretary to deal with such matters as :—

Administration

(*a*) Conferences and Congresses.
(*b*) International competitions.
(*c*) Standards of professional qualifications.
(*d*) Co-ordination of foreign visits, exchange of students, teachers and practising architects.

Information Services

(*a*) Library and exchange of information including bibliographical material, digests, bulletins, and translations.
(*b*) Arrangements for publications and the reproduction of illustrations, exhibition material and its distribution.

Contact with other organisations. (Federation of Housing and Town Planning, etc.)

This Working Committee consists of M. van den Broek, M. Burckhardt, Mr. Goldfinger, Professor Holford, M. Krejcar, M. William Olsson, M. Vago.

It was agreed that the Executive Committee should consist of representatives of Belgium, France, Great Britain, Poland, Portugal, Sweden and Switzerland, three places on the committee being reserved for the Latin-American countries, the U.S.A. and the U.S.S.R.

May I add that the success of the conference was largely due to the double patronage of the R.I.B.A. and of the British Council. The R.I.B.A. offered hospitality to the conference proper in putting at its disposal its Council chamber and its committee rooms for a full week, and also by helping to a very large extent in the finances of the conference. The British Council not only extended its hospitality for two weeks to all the foreign delegates, but also organised, in a most competent way, tours, visits and travel by rail, river and air.

Yours faithfully,

E. GOLDFINGER,
Honorary Secretary.

OBITUARIES

Ewart Gladstone Culpin, J.P. [*F.*]

We regret to record the death of Ewart Gladstone Culpin [*F.*] at the age of 68. He was perhaps the most outstanding personality in that small but growing band of architects who devote time and energy to service on the councils of public authorities. For twenty-one years he was a member of the London County Council, which showed its appreciation of his services by electing him to the high honour of Chairman 1938-39. Although a member of a political party he did not allow party considerations to influence his convictions on architectural matters and he was prepared to disagree with his party if he thought they were wrong, as he did on a notorious occasion recently. All his life he was a profound believer in the principles of town planning and housing as originally laid down by Patrick Geddes, Ebenezer Howard and Raymond Unwin, and it is good that he lived to see them beginning to bear their full fruit in the New Towns Act.

Because so much of Culpin's work was devoted to public service we asked Mr. Richard Coppock [*Hon. A.*], a fellow member of the London County Council, to give fellow architects an appreciation of Culpin's political work. Mr. Coppock writes :

"I am sure there were many who shared with me a feeling of profound regret and sorrow at the death of Ewart Gladstone Culpin. He was a political colleague of mine for the past 25 years and I knew Ewart very well indeed.

"He fought hard for town planning and good architecture and there can be seen in some of the London buildings the embodiment of many of his ideas. He proved a valuable member of the Housing Committees and as a fellow member with him on those committees, I had the pleasure of listening to him on many occasions and I appreciated the great knowledge which he possessed and the vigour of his arguments.

"He and I stood for election in South Paddington in the years gone by and we were soundly defeated. It was an interesting fight with Culpin as a fine colleague and a grand scrapper ! Ewart was very much concerned with the development of London's Green Belt, and when I was chairman of the Committee responsible for the purchase of the Green Belt, he gave me invaluable advice and assistance. He was so anxious that the sprawl of London should be stopped that he spent many hours with me discussing the many aspects of the Green Belt development. Having held the chairmanship of the London County Council he was of considerable assistance to me when it was my turn to preside over the Council's proceedings. He was very diplomatic in his manner and had a happy way with him. He was one of the best mixers I have ever met—and he could tell a very fine story ! Ewart was always very hearty in whatever he did.

"We have lost a good friend in the passing of Ewart Gladstone Culpin who, during the last few years of his life, must have suffered untold pain. He sat, almost to the last hour, in the Council chamber, and his colleagues always knew his conscientiousness was such that he would never support anything which was contrary to his æsthetic tastes or the high principles of his profession.

"All those who had the privilege of association with Ewart will mourn his loss."

Born in Stevenage and educated at the Alleynes Grammar School there, and later at the Hitchin Grammar School, he worked first as a journalist until in 1905 he became secretary of the Garden Cities and Town Planning Association, a post he held until 1918. During that time he studied housing conditions on four continents, organised social study tours for visitors from abroad and carried out a ceaseless campaign of lectures in Europe and America advocating what are now called "New Towns." In 1907 he founded the International Garden Cities and Town Planning Association and took an important part in the planning for the reconstruction of Belgium and was President d'Honneur of an International Committee of Architects who were engaged on the work. For this he was decorated Officer of the Order of the Crown of Belgium ; he was also a Grand Officer of the Crown of Rumania and a Commander of the Order of the Black Star of Benin.

A foundation member of the Town Planning Institute and later its President (1937-38), to meet the demand for expert guidance in forming Public Utility Societies to build housing estates, Mr. Culpin set up as a Housing Adviser and in 1918 entered into partnership in London with the late Mr. R. Stewart Bowers [*F.*]. The scope of the practice was extended to include town planning and they became consultants to over twenty local authorities and the firm acted as architects for a great many housing schemes, office buildings, the Camberwell Town Hall Extension and in connection with Transport House, Smith Square.

On the dissolution of the partnership in 1936 Mr. Culpin took his son, Mr. Clifford E. Culpin [*F.*] into partnership and they were responsible for flats, factories, offices and municipal buildings, including the Greenwich Town Hall. At the time of Mr. Culpin's death, the firm was engaged on a big scheme for the Wandsworth Borough Council and on a number of housing schemes in the country.

Mr. Culpin's foremost interests throughout his career were the abolition of the slums, the preservation of a Green Belt around London and the creation of New Towns. His literary work included a number of booklets and pamphlets on housing and town planning. Seeing that service in Local Government might further these worthy aims, in 1925 he became an Alderman of the London County Council and had the unique honour of holding the office of Vice-Chairman for the three years 1934-37 prior to his being elected Chairman of the Council 1938-39. He represented the London County Council on ten outside bodies and was a member of the King George V Memorial Committee, Chairman of the Greater London Regional Planning Committee and later a member of the Advisory Committee for London Regional Planning. He was a trustee of the Crystal Palace and of the Czech Refugee Trust Fund and to the latter he devoted much time and energy during the war years.

Mr. Culpin served as a Licentiate member of the R.I.B.A. Council 1931-32.

James Smith [*F.*]

Notification has been received of the death of James Smith [*F.*] on 25 June 1946 in Temperley, Argentina, at the age of 76. The following appreciation of Mr. James Smith appeared in the Argentine English newspaper *Standard* and has been forwarded by his widow:—.

"A gloom was cast over the headquarters of the Way and Works Department of the Southern and Western Argentine railways when news was received of the death of Mr. James Smith, the former chief architect.

"Completing thirty years' railway service in the country, the late Mr. Smith retired on pension in 1938, returning to Scotland during the earlier part of the War, where his services were utilised in connection with safety measures for buildings against bombing, under the direction of the Scottish section of the Ministry of Works. Returning to Argentina about three years ago, and in poor health as a result of strain brought about by continual air-raids, he settled in Temperley, where he had formerly resided.

"Exceedingly popular among colleagues and subordinates, and an able architect, his passing leaves an irreparable gap in local Scottish and railway circles.

"Born in 1879, Mr. Smith received his early education at Hillhead High School and Allen Glen's School, both in Glasgow, and then subsequently attended the Royal Technical College and the School of Arts in the same city, where he graduated with an associate membership of the Royal Institute of British Architects. From 1894 to 1899 articled to Mr. J. B. Wilson, the well-known Glasgow architect, he was subsequently employed on the Caledonian Railway as an assistant architect.

"Engaged as junior on the construction of the Glasgow Central Station, under Sir Donald Matheson, the then chief engineer and subsequent general manager, Mr. Smith entered the service of the Buenos Aires Great Southern Railway on contract in 1908. Actively engaged and in charge of the design of all building development on this Railway, he was the principal of the architects engaged on the design of the terminal station at Plaza Constitution under the late Colonel R. G. Garrow, C.B.E., the then chief engineer. He was also concerned with the planning of the suburban stations at Banfield, Lomas and Temperley, the Dormy House at Miramar and stations constructed during the more recent extensions. From 1936 up to the time of his retirement he was chief of the technical office of the Way and Works Department of the Southern and Western Railways. Mr. Smith was a prominent Freemason. "Member of Excelsior Lodge, Past District Grand Warden of the Southern Division of South America 3rd, District Grand Principal, Past 1st Principal of St. Andrew's Chapter, Past Master of Excelsior Lodge and Past District Grand Warden of the District Grand Lodge of Mark Master Masons, he was president of St. Andrew's Society in 1937. He was for many years up to the time of his death an Elder of the St. Andrew's Scots Church in Buenos Aires.

"Besides the widow, the former Miss Elizabeth Reynolds, he leaves four daughters to mourn his passing."

NOTES AND NOTICES

NOTICES

The Fifth General Meeting

TUESDAY, 28 JANUARY 1947, AT 6 P.M.

The Fifth General Meeting of the Session 1946-47 will be held at 6 p.m. on Tuesday, 28 January 1947, for the following purposes :—

To read the minutes of the Fourth General Meeting held on 14 January 1947 ; formally to admit new members attending for the first time since their election.

Professor W. G. Holford, B.Arch.(Lvpl.), M.T.P.I. [*A.*], to read a paper on " New Towns."

Light refreshments will be provided before the meeting.

The Sixth General Meeting

TUESDAY, 11 FEBRUARY 1947, AT 6 P.M.

The Sixth General Meeting of the Session 1946-47 will be held at 6 p.m. on Tuesday, 11 February 1947, for the following purposes :—

To read the minutes of the Fifth General Meeting held on 28 January 1947.

The President, Sir Lancelot Keay, K.B.E., to present the Medals and Prizes 1947 and to deliver his address to architectural students.

Light refreshments will be provided before the meeting.

Session 1946-47

Minutes III

At the Third General Meeting of the Session 1946-1947, held on Tuesday, 10 December, 1946, at 6 p.m.; Mr. L. H. Keay, O.B.E., President, in the chair.

The meeting was attended by about 220 Members and guests.

The minutes of the Second General Meeting, held on Tuesday, 26 November, 1946, were taken as read, confirmed and signed as correct.

The following Members attending for the first time since their election were formally admitted by the President:—

AS FELLOWS

Mr. Maurice Sanders; Mr. Rodney F. Tatchell.

AS ASSOCIATES

Mr. G. J. Cuzens; Mr. W. H. Gill.

AS LICENTIATE

Mr. C. A. F. Sheppard.

Mr. John Summerson, B.A. (Arch.), F.S.A., [*A.*], Curator of the Sir John Soane's Museum, having read a paper on " Heavenly Mansions: An Interpretation of Gothic," a discussion ensued and on the motion of Sir Alfred W. Clapham, C.B.E., F.B.A., F.S.A., Secretary of the Royal Commission on Historical Monuments, seconded by Professor Geoffrey Webb, M.A., [*Hon. A.*], a vote of thanks was passed to Mr. Summerson by acclamation and was briefly responded to.

The proceedings closed at 7.40 p.m.

R.I.B.A. Annual Dinner 1947

The Annual Dinner will take place on Friday, 21 March 1947, at 7 for 7.30 p.m., in the R.I.B.A. Henry Florence Hall, 66 Portland Place. Full particulars are contained in the circular letter to members enclosed with this issue of the JOURNAL. Applications for tickets, which must be accompanied by cheques or postal orders, should be sent to the Secretary, R.I.B.A., not later than Wednesday, 19 February, 1947.

British Architects' Conference

DUBLIN, JUNE 1947

The next Annual Conference of the R.I.B.A. and its Allied and Associated Societies will be held in Dublin from 11-14 June 1947, inclusive.

The Royal Institute of the Architects of Ireland have in hand the preparation of a most attractive programme and particulars will be issued in due course.

Annual Subscriptions

Members' subscriptions, Students' and Subscribers' contributions became due on 1 January 1947.

The amounts are as follows :—

Fellows	£7 7 0
Associates	£4 4 0
Licentiates	£4 4 0
Students	£1 11 6
Subscribers	£1 1 0

For members resident in transoceanic dominions, who are also members of Allied Societies in those Dominions, the subscriptions are :—

Fellows	£4 4 0
Associates	£3 3 0
Licentiates	£3 3 0

Exhibition of Prize Drawings

15 JANUARY TO 12 FEBRUARY 1947

The Annual Exhibition of Designs and Drawings submitted for the Prizes and Studentships 1947 will be open at the R.I.B.A. from Wednesday, 15 January to Wednesday, 12 February 1947 inclusive. The Exhibition will remain open daily (Sundays excepted) free to the public between the hours of 10 a.m. and 6 p.m. (Saturdays 10 a.m. and 5 p.m.).

Publicity

The Practice Committee recommend all members to ensure that when writing or approving an article or descriptive note for the Press, technical or otherwise, relating to a completed building, the names of the quantity surveyor and contractor are always mentioned.

Associates and the Fellowship

Associates who are eligible and desirous of transferring to the Fellowship are reminded that if they wish to take advantage of the next available election they should send the necessary nomination forms to the Secretary R.I.B.A. as soon as possible.

Part-Time Study for R.I.B.A. Examination

The R.I.B.A. has been notified that several students who desire part-time or evening training in architecture have been unable to secure admission to a suitable technical college or art school. This matter is receiving the Institute's attention and the Secretary would be glad to hear of any students who experience difficulty in this direction.

Composition of Subscriptions for Life Membership

Fellows, Associates and Licentiates of the R.I.B.A. may become Life members by compounding their respective annual subscriptions. Full details may be obtained on application to the Secretary, R.I.B.A.

ALLIED SOCIETIES

The Royal Institute of the Architects of Ireland

ANNUAL DINNER, 1946

The annual dinner of the Institute was held on 27 November at the Royal Hibernian Hotel, Dublin, and was attended by 185 members and guests. Among the latter were representatives of the learned societies and of the medical, legal and engineering professions. The principal guest was the President, Mr. L. H. Keay, O.B.E., who was accompanied by Mrs. Keay, Miss Anne Keay and Mr. C. D. Spragg, Secretary, R.I.B.A.

The toast of " Our Guests " was proposed by Mr. Vincent Kelly, who said that the Institute welcomed most heartily a large number of distinguished guests. Most honoured was the President of the R.I.B.A., Mr. Keay, who, accompanied by his charming wife and daughter, and by the Secretary of his Institute, Mr. Spragg, had braved the perils of the air to come to Dublin.

Mr. Keay bore a very distinguished and international reputation in architecture, particularly in the sphere of housing, a sphere in which in other countries the architect was more pre-eminent than had hitherto been the case in the U.K. As President of the R.I.B.A. he was burdened with a great responsibility controlling a world-wide architectural organisation, with which the Institute was proud to be in close alliance, and which, in turn, had given signal proofs of its interest in the work and problems of the R.I.A.I. It was their hope and belief that during Mr. Keay's term of office the bonds between the two Institutes would be even further strengthened.

Also among the guests, he said, were Mr. Frank McArdle and Mr. Jack Stephenson, two ex-presidents of the R.S.U.A. Their presence gratified the Institute not only on personal grounds, but for their strenuous and successful efforts to restore a unity between the two bodies which had for years been unhappily sundered.

Mr. Bethel Solomons, President of the Royal College of Physicians of Ireland, in responding to the toast, said the Dublin Corporation was doing excellent work for housing in the city. Housing, from the point of view of public health, should also be considered in the rural areas. At present there were many people living in rural cottages who suffered from tuberculosis, and until the housing situation was improved the incidence of this disease would tend to increase. Good work was being done by the municipal authorities in conjunction with architects and medical men, and he would urge that in all housing schemes the architect should be in consultation with a doctor. It had been said that people did not always appreciate the benefits of good housing, and in this respect he thought that the Labour Party could play an important part in encouraging and training people to take the fullest advantages of the housing amenities provided for them.

The toast of "The Royal Institute of the Architects of Ireland" was proposed by Mr. L. H. Keay, who said that he had very pleasant recollections of his visit to Dublin earlier in the year when he had been very kindly received and entertained by the Lord Mayor and by the President of the R.I.A.I. and members of the Council. He hoped to lead a stronger architectural invasion of Dublin in the near future.

Mr. Keay spoke of the close and amicable relations which had existed for over a century between the R.I.A.I. and the R.I.B.A. He was glad that in the past his Institute had been able to hold out the hand of friendship to the R.I.A.I. He said that Dublin, more than any of the great cities of Europe, exemplified the influence of the eighteenth century. Irish architects should not rest until they had once again achieved a golden age in architecture. He stressed the importance of securing proper public recognition of the status of architects and the profession, and emphasised the fact that this could properly be achieved only by registration; he urged the members of the R.I.A.I. to leave nothing undone to secure legislation to that effect.

Mr. Stephen S. Kelly, President of the R.I.A.I., responded to the toast and referred to the manner in which the R.I.B.A. had encouraged the R.I.A.I. from its foundation. The manner in which Mr. Keay had proposed the toast had warmed their hearts; the R.I.B.A. had been a fairy godmother to the Institute, and he felt sure that in the President of that great organisation the R.I.A.I. had a sincere and genuine friend. For more than a hundred years the Institute, as governing body of the profession in Ireland, had an enviable record of service to the country and of unselfish sacrifice by the members. The official stamp of registration had not yet been accorded to architecture in Eire; most progressive countries in the world had found it to their advantage to enact registration laws, and he felt confident that the Government would in the near future remedy this defect. He concluded by thanking Mr. Keay and the guests for the manner in which the toast had been proposed and received.

Essex, Cambs. and Herts Society of Architects.

WEST ESSEX CHAPTER

The West Essex Chapter has now got back into its stride and regular meetings are now being held, following a period during the war when meetings were exceedingly difficult to arrange.

In August 1946 a party visited the Building Research Station and in September Grays Cement Works was visited. Here the party was entertained by the Associated Portland Cement Manufacturers. The Chapter held a meeting at the South-West Essex Technical College in October and a speaker from the Lead Industries Development Council delivered an interesting address. The pre-war theatre-dinner was resumed on 14 December and there was an attendance of 50 members and guests.

On 6 January a discussion evening was held at the South-West Essex Technical College and the annual general meeting and dinner will be held, as usual, on Shrove Tuesday, 18 February.

The Chapter particularly asks members to notify the Hon. Secretary, Mr. D. A. Thomerson [*A.*], 76 Finsbury Pavement, London, E.C.2, of any change of address.

MEMBERS SERVING WITH THE FORCES

Killed

LAND: FRANK H. [*L.*], Major R.E.

Decorations and Distinctions

BIRD: G. V. [*A.*], Capt. R.E. Awarded the George Medal.

LAWSON: J. G. S. [*A.*], Major R.E. Awarded the Efficiency Decoration.

PACK: E. V. [*A.*], Major R.E. Mentioned in Despatches.

PIGGOTT: J. R. [*F.*], Lieut.-Col. R.E. Again Mentioned in Despatches.

COMPETITIONS

Village Planning Competition

The Central Landowners Association invites architects to submit, in competition, designs for the development of four villages.

Assessors: Prof. Sir Patrick Abercrombie, P.P.T.P.I. [*F.*]; Mr. G. Langley-Taylor, M.T.P.I., F.S.I., F.L.A.S. [*F.*]; Mr. Thomas Rayson, F.S.A. [*F.*].

Premiums: £250, £200, £150 and consolation prize (or prizes) of £100.

Last day for submitting designs: 30 June 1947.

Last day for questions: 28 February 1947.

Conditions may be obtained on application to the Central Landowners Association, 58 Victoria Street, S.W.1.

Deposit: one guinea.

Competition for the Extension of the Fife County Council Buildings

The County Council of Fife invite architects of British nationality resident in Scotland to submit designs for alterations and extensions of County Buildings, Cupar, Fife.

Assessor: Mr. A. G. R. Mackenzie [*F.*].

Premiums: £500, £300 and £200.

Last day for submitting designs: 31 March 1947.

Conditions may be obtained on application to J. M. Mitchell, Esq., County Clerk, County Buildings, Cupar, Fife.

Deposit, one guinea.

Proposed Technical College: Peterborough

Peterborough Joint Education Board invite architects of British nationality to submit in open competition designs for new buildings to be erected at Peterborough for a technical college.

Assessor: Mr. T. Cecil Howitt, D.S.O. [*F.*].

Premiums: £500, £250 and £150.

Last day for submitting designs: 30 June 1947.

Last day for questions: 28 February 1947.

Conditions may be obtained on application to The Chief Education Officer, Education Offices, Peterborough.

Deposit: £2 2s.

MEMBERSHIP LISTS

ELECTION: 10 DECEMBER 1946

The following candidates for membership were elected on 10 December 1946:—

AS HONORARY ASSOCIATES (2)

KEMPER: EDWARD CRAWFORD, Chevy Chase, Md., U.S.A.

MORTLOCK: THE REV. CHARLES BERNARD, M.A. (Cantab), F.S.A.

AS HONORARY CORRESPONDING MEMBERS (2)

CONTRERAS: CARLOS, Mexico City.

TOURNON: PAUL, Paris.

AS FELLOWS (12)

BENIANS: HUBERT JOSEPH [*A.* 1911].

CLARKE HALL: DENIS [*A.* 1936].

CLAYTON: GERALD RUPERT [*A.* 1920], Durham.

COOTE: LIONEL FRANCIS RUSSELL [*A.* 1929].

COVELL: RALPH GEORGE [*A.* 1935].

GREEN: MAURICE SYDNEY [*A.* 1934], Totnes.

HARPER: DENIS RAWNSLEY, [*A.* 1932], Cape Town.

HILL: JOHN JAMES [*A.* 1936], Southampton.

ROWE: HAROLD BERTRAM [*A.* 1925], Exeter.

TOMKINS: CYRIL JAMES [*A.* 1930], Norwich.

WYLSON: JOHN DUNCAN, A.A.Dip. [*A.* 1936].

And the following Licentiate who is qualified under Section IV, Clause 4 (c) (ii) of the Supplemental Charter of 1925:—

SURRIDGE: HENRY RALPH, Kettering.

AS ASSOCIATES (94)

ADAMSON: HAMISH EDGAR DONALD.

ADAMSON: JOSEPH WILLIAM, Huddersfield.

AITCHISON: ROBERT, Glasgow.

ALLISON: JAMES PATERSON, M.A., B.Sc., Irvine, Ayrshire.

ASLAN: NAIM JACOB.

AXELROD: AXEL ABRAHAM, Johannesburg.

AYERS: LAURENCE, Bulawayo.

BARLOW: LEONARD ROBERT.

BEARD: PHILIP, Plymouth.

BEERS: JAMES HAROLD, Belfast.

BETHAM: RICHARD MORLAND.

BROADHEAD: GORDON LESLIE.

BROOKE: JOHN RICHARD PETER.

BURGIS: NORMAN LESLIE SEWELL.

CALDERWOOD: DOUGLAS MCGAVIN, Pretoria.

CHAN: HTYAN HOE.

CHEETHAM: JAMES HAROLD, Warrington.

CLARK: JOHN ALEXANDER.

CLARK: JOHN FORBES, D.F.C., Stourbridge.

CLARKE: JOSEPH EDMUND (Capt.), Carnalea, Co. Down.

CLAYDON: BERNARD, Bolton.

CLIFFORD-TURNER: HARRY DUDLEY.

CONNELL : HUGH CAMPBELL, B.Sc.(Arch.), Bolton.
CONNOR : GEORGE STANLEY WORDSWORTH, Leeds.
CUNNINGHAM : RONALD THOMPSON, Coatbridge.
DAVEY : FREDERICK WILMOT.
DAWSON : HENRY DEARLE.
DIXON : JOHN CULLEN, Leeds.
DODDS : KENNETH, Newcastle-on-Tyne.
DOLAN : MISS MARY ETHNA, Dublin.
DOLMAN : MOWBRAY.
DORAN : PATRICK JOSEPH.
ELLIOTT : LEONARD WILLIAM.
ELLIOTT : RAYMOND FOSTER.
FLEMING : GEORGE WILSON, Craigie, Perth.
FLOYD : HUGH COULDERY, Kenilworth, C.P., South Africa.
FRENCH : WILLIAM JOHN, Linlithgow.
GODDARD : FREDERIC WALTER, Edinburgh.
GOUGH : JAMES JOSEPH, Dublin.
GRAY : ALFRED JOHN, Stockport.
GREEN : TREVOR CURZON, Runcorn.
HAGUE : JOHN AMOS, Northampton.
HALL : JOHN BUCHAN, Galashiels.
HENGIST : CHARLES JAMES AMBROSE.
I'ANSON : TOM NORMAN, Huntingdon.
JANES : ERIC RALPH.
JOHNSON : MRS. CONSTANCE MARY, Leeds.
JOUBERT : HENRI NEL, Johannesburg.
KEYES : JULIAN WALTER.
KING : BASIL CLIFTON.
LARRINGTON : CLIFFORD TALBOT, Newton Abbot.
LEWIS : MISS JEAN ELIZABETH JARMAN, Cardiff.
LOCK : WILLIAM CHARLES.
LUMSDEN : JOHN LAWRIE, Edinburgh.
McDONALD : GEORGE GORDON, Paisley.
MACIVOR : GEORGE ALEXANDER SMITH, Cape Town.
McLAUCHLAN : STEWART FARRINGTON, Llandudno.
MASSEY : LAWRENCE, Dipl.Arch.Mancr., Crewe.
MAW : GEOFFREY MORRISON.
MAXWELL : JOHN MAITLAND.
MOFFAT : DANIEL THOMAS, Derby.
NATTRASS : MRS. MARY, Stockton-on-Tees.
NEEDES : PERCIVAL JAMES.
ODDIE : GUY BARRIE, B.Arch., Ryton-on-Tyne.
OLIVER : DAVID WARE, Bath.
OWEN : WALTER GLYN, Dudley.
PAGE : STANLEY GLASSON.
PARRY : MERVYN HENRY, D.F.C., A.F.C.
PASSMORE : EDWARD.
PATTON : HENRY ALEXANDER, Bangor, Co. Down.
PORTER : GRAHAME KENNETH, Dipl.Arch.(Dist.), Cardiff.
PRATT : HAROLD JAMES CULLERNE.
PYNE : HENRY JOHN EVERETT.
RADFORD : HEDLEY GEORGE, Derby.
SCOTT : CHARLES FREDERICK, Westbury-on-Trym.
SECRETT : MICHAEL JOHN FREDERICK.
SHEPHEARD : MICHAEL HENRY, Birkenhead.
SHIPP : GODFREY BARNES, Nottingham.
SMITH : JOHN, Bury.
SQUIRES : JOHN HORACE RUSSELL.
STAFFORD : ROBERT HENRY PARKER.
STEWART : DONALD RAE, B.A., Dipl.Arch.(Cantab).
THOMAS : EDWARD TREVOR, Newcastle-on-Tyne.
THOMS : KENNETH OGILVIE, Edinburgh.
THORNLEY : ROY DESMOND.
TURNBULL : PHIPPS, Edinburgh.
WALTERS : WILLIAM JOSEPH, Carmarthen.
WATERHOUSE : JACK, Lancaster.
WHITELEY : MISS MARGARET, Elland, Yorks.
WHITTLE : JACK.
WILDGUST : ALBERT, Shaw, Lancs.
WILLIAMS : GILBERT BECKET ARTHUR.
WILLIAMS : JOHN, Dipl.Arch.(Dist.) Lvpl., Liverpool.
WYLER : DERRECK ROY, Thornliebank, Renfrewshire.

AS LICENTIATES (30)

ANDERSON : WILLIAM.
ARMITAGE : HERBERT KELSALL (Major R.E.).
BANHAM : CHARLES THOMAS.
COLLINGS : GEORGE FREDERICK, Leicester.
CORFIELD : CLAUD WILLIAM ROGER, M.A. Cantab., Falmouth.
CRAWLEY-CHALLENER : LEONARD.
DADLEY-MOORE : ARTHUR.
DUCRET : CECIL THOMAS GEORGE.
GUNNELL : WALTER BERNARD, M.B.E. (Major).
HAWES : HERBERT BADEN CHARLES (Major).
HERBERT : LEONARD CHARLES GEORGE.
IND : LESLIE.
JAY : FREDERICK EDMUND, Dorchester.
KENDALL : EDWIN PERCY.
KENYON : HORACE GOODALL, Newmarket.
LYNDE : RONALD DOBELL.
MARSH : WALTER, Carmarthen.
OGDEN : LIONEL GEORGE DOUGLAS, Rugby.
PARRY : ELWYN, Mold, Flints.
PIGGINS : WILFRID CHARLES.
ROBINSON : WILLIAM EDWARD.
RUSHTON : NORMAN JAMES.
SCHREINER : JOHANNES.
SMITH : DENIS, Rochdale.
SMITH : HARRY.
STEWART : GEORGE SMITH, Fraserburgh.
STURTON : WALTER LAURENCE.
WILLIAMS : JOHN LESLIE MAXWELL, Manchester.
WILLIS : ARTHUR WILLIAM (Major).
WRIGHT : PHILIP RALPH.

ELECTION : 11 FEBRUARY 1947

An election of candidates for membership will take place on 11 February 1947. The names and addresses of the candidates, with the names of their proposers, found by the Council to be eligible and qualified in accordance with the Charter and Bye-laws, are herewith published for the information of members. Notice of any objection or any other communication respecting them must be sent to the Secretary, R.I.B.A., not later than Saturday, 1 February.

The names following the applicant's address are those of his proposers.

AS HON. CORRESPONDING MEMBER (1)

VISCHER : PAUL, Hon. Member of the Swiss Society of Engineers and Architects ; President of the Comite Permanent International des Architects. 88 Lange Gasse, Basle, Switzerland. Proposed by the Council.

AS FELLOWS (7)

GREEN : RALSTON TILSLEY [*A.* 1926], Kent County Council, Buildings Department, Maidstone ; Mote Bungalow, Mote Park. Sidney Loweth, R. A. Cooksey and Sir George Oatley.

HURST : ROBERT JOSEPH, M.A. Cantab. [*A.* 1935], 72 New Cavendish Street, W.1 : 17 Corringham Road, Golders Green, N.W.11. W. L. Dowton, R. A. Cooksey and H. C. Hughes.

JOHNSON : FRANK LESLIE [*A.* 1921], Beech End, Poltimore Road, Guildford. C. J. Cable, E. M. Joseph and F. M. Cashmore.

MOIR : BERKELEY LOWNDES (Lieut.-Commander R.N.V.R.) [*A.* 1937], Marymead, Jowkin Lane, Bamford, Rochdale. Robert Cromie, Prof. L. B. Budden and Prof. Sir Charles Reilly.

POTTER : FRED [*A.* 1939], Town Hall Chambers, Bromsgrove, Worcestershire ; "Broadlands," Middleton Road, Bromsgrove. Reginald Edmonds, J. B. Surman and Herbert Jackson.

And the following Licentiates who have passed the Examination qualifying for Fellowship :—

DOYLE : FRANCIS FREDERICK JAMES HODGES, P.A.S.I., Estate Dept., The Prudential Assurance Co., Ltd., 142 Holborn Bars, E.C.1 ; 1 Denehurst Gardens, Richmond, Surrey. H. Colbeck, A. J. Fowles and Horace Cubitt.

SEARLEY : FRANK JOHN, E.10, War Office, W.1 ; 318 Woodgrange Drive, Thorpe Bay, Essex. W. A. Ross, C. V. Ponder and P. G. Hayward.

AS ASSOCIATES (15)

AMCOTTS : WILLIAM (Leeds Sch. of Arch.), Hemingbrough Vicarage, Selby, Yorks. Applying for nomination by the Council under Bye-law 3 (*d*).

BOOTHROYD : ALEX RICHARD (Nottingham Sch. of Arch.), 15 Charles Avenue, Derby Road, Beeston, Nottingham. George Checkley, T. C. Howitt, F. S. Broadhead.

CHONG : SWEE WAH (Arch. Ass., London), c/o The China Institute, 16 Gordon Square, W.C.1. George Fairweather, Frederick Gibberd, Richard Sheppard.

FLEMING : ROBERT SINCLAIR [Special Final Exam.], 96 Audley Road, Hendon, N.W.4. Henry Tanner, Horace Cubitt, F. W. Halfhide.

FLEMING : THOMAS LOUDON (Glasgow Sch. of Arch.), 16 Ochil Street, Alloa, Scotland. W. J. Smith, J. A. Coia, Ronald Bradbury.

HANDS : STANLEY JAMES [Special Final Exam.], "Wilmar," Hartford Road, Huntingdon. J. H. Longstaff, W. A. Lea, H. W. Hobbiss.

HANN : EDMUND GRAEME, B.Arch.(L'vpl.), (Liverpool Sch. of Arch., Univ. of Liverpool), Hazel Hurst, Kerne Bridge, Ross-on-Wye. Prof. L. B. Budden, B. A. Miller, F. X. Velarde.

HARRIS : MAURICE HENRY [Special Final Exam.], " Fieldgate," Stoneleigh Road, Gibbet Hill, Coventry. A. H. Gardner, Rolf Hellberg, W. S. Hattrell.

MCKENZIE : (MISS) SHEILA (The Poly., Regent Street, London, Sch. of Arch.), " The Hollies," Fernden Lane, Haslemere, Surrey. E. C. Scherrer, J. K. Hicks, L. A. Chackett.

MOLLETT : (MISS) ENID (The Poly., Regent Street, London, Sch. of Arch.), 46 Cranston Road, Forest Hill, S.E.23. E. C. Scherrer, Anthony Minoprio, J. K. Hicks.

NEWCOMBE : VERNON ZUNZ, A.M.T.P.I. [Final], 36 Diamond Street, Saltburn-by-the-Sea, Yorks. G. A. Jellicoe, F. Willey, R. R. Kitching.

POGANY : DENES [Special Final Exam.], Ruflands, 9 Barretts Road, Dunton Green, Sevenoaks. H. R. Steele, H. M. Fairweather, T. S. Tait.

RHEINBERG : ERIC (Arch. Assoc., London), 80 Barn Hill, Wembley Park, Middlesex. R. F. Jordan, George Fairweather, R. E. Enthoven.

RITTER : ERIC ERNEST (Northern Poly. (London) Dept. of Arch.), 61 Cheverton Road, N.19. T. E. Scott and applying for nomination by the Council under Bye-law 3 (*d*).

STANFORD : (MISS) ADELA LUCIA LYNDON (The Poly., Regent Street, London, Sch. of Arch.), 17 Beeches Avenue, Carshalton, Surrey. E. C. Sherrer, Anthony Minoprio, J. K. Hicks.

AS LICENTIATES (39)

ABERCROMBIE : NATHANIEL GORDON, M.A.(Arch.) Cantab. ; 33, Welbeck Street, W.1 ; The Red House, Aston Tirrold, Berks. F. C. Saxon, Prof. Sir Patrick Abercrombie, T. A. L. Concannon.

ALLEN : SIDNEY NORMAN, c/o Town Hall, Leyton, E.10 ; 7 Arundel Drive, Woodford Green, Essex. H. C. D. Whinney, H. A. Hall, L. M. Gotch.

ATKINSON : KENNETH, Doncaster R.D.C., Nether Hall, Doncaster ; 74 Clarkegrove Road, Sheffield 10. H. A. Hickson and the President and Hon. Secretary of the Sheffield, South Yorks. and District Soc. of Arch. and Surveyors, under Bye-law 3 (*a*).

ATKINSON : WILLIAM CHILD, M.A. (Oxon), 34 Fairfield Road, Toller Lane, Bradford, Yorks. C. Sunderland and the President and Hon. Secretary of the West Yorks. Soc. of Arch. under Bye-law 3 (*a*).

BAILEY : THOMAS AUBREY, c/o Sir Giles Gilbert Scott, O.M., R.A., D.C.L., LL.D., P.P.R.I.B.A., 3 Field Court, Gray's Inn, W.C.1 ; 12 Anne Boleyn's Walk, Cheam, Surrey. Sir Giles Scott, A. G. Scott, F. G. Thomas.

BAMFORD : ADIE, 19 Queen Anne's Gate, S.W.1 ; 28 Carlton Road, Erith, Kent. Oliver Law, John Swarbrick, J. E. Townsend.

BATH : JOHN HENRY ARTHUR, " Golden Sunset," Nore Road, Redcliffe Bay, Portishead, Som. Applying for nomination by the Council under Bye-law 3 (*d*).

BLAIR : ARCHIBALD STAMPER, 95 Colmore Row, Birmingham, 3 ; 60 Woodlands Farm Road, Erdington, Birmingham, 24. F. J. Osborne, H. W. Hobbiss, S. J. Stainton.

BROOKS : JOHN, Victoria Chambers, Wood Street, Wakefield ; " Yewgarth," Thornes Road, Wakefield. J. E. Stocks and the President and Hon. Secretary of the West Yorks. Soc. of Arch. under Bye-law 3 (*a*).

COLTMAN : ARTHUR OAKLEY, M.B.E., 147 Dyke Road, Brighton, Sussex. Gordon Leith, S. C. Dowsett, Robert Howden.

COPPING : JOHN, Buildings Dept., Kent County Council, Springfield, Maidstone ; 36 Blythe Road, Maidstone, Kent. S. H. Loweth, E. B. Musman, R. F. M. Mellor.

COTTINGHAM : HECTOR DILLON COURTNEY (Major), Architectural and Surveying Assistant, Ministry of Works ; " Rose Cottage,"Stanford Avenue, Hassock, Sussex. Charles Whitby, P. M. Anderson, and applying for nomination by the Council under Bye-law 3 (*d*).

COX : OLIVER CHARLES, City Engineer's Department, The Guildhall, Nottingham ; 46 Charnock Avenue, Wollaton Park, Nottingham. E. Frear, K. W. F. Harris, G. L. Broadbent.

CRAIG : JOHN STONE, 9 Rosebery Crescent, Edinburgh ; 56 Manse Road, Newmains, Wishaw. R. C. Ballantyne and the President and Secretary of the Edinburgh Arch. Assoc. under Bye-law 3 (*a*).

CRAVEN : ARTHUR DENBY, Borough Surveyor's Dept., Town Hall, Tunbridge Wells ; 18 Crendon Park, Southborough, Tunbridge Wells, Kent. John Hardwick, C. H. Strange, Cecil Burns.

FRY : NEVILLE LEWIS, Tottenham & District Gas Co., Woodall House, 658 Lordship Lane, N.22 ; 40 Russell Road, Buckhurst Hill, Essex. T. E. Scott, Harold Mileson, J. E. Lancashire.

HANNEN : LLEWELLYN OMAR LEO., 9 Victoria Street, Westminster, S.W.1 ; 17 Warren Drive, Kingswood, Surrey. Thomas Rayson, W. A. Forsyth, H. Lidbetter.

HENDRY : ROBERT ARCHIBALD, c/o J. C. Robertson, Esq., Kirkwall, Orkney ; 8 Union Terrace, Aberdeen. T. S. Sutherland, G. A. Mitchell and applying for nomination by the Council under Bye-law 3 (*d*).

HILLS : GEORGE CHARLES MARRINER, County Architects' Dept., Herts County Council, County Hall, Hertford, Herts ; 55 Finchley Lane, Hendon, N.W.4. G. M. Trench and the President and Hon. Secretary of the Essex, Cambridge and Hertfordshire Soc. of Arch. under Bye-law 3 (*a*).

HOPKINSON : WILLIAM, Borough Engineer's Dept., County Borough of Bury ; 496 Bolton Road, Bury, Lancs. Frederick Jackman and the President and Hon. Secretary of the Manchester Society of Arch. under Bye-law 3 (*a*).

HOWARD : ALFRED HENRY, c/o Arthur E. T. Mort, Esq., Westminster Bank Chambers, High Street, Winchester ; 17A St. Cross Road, Winchester, Hants. A. E. T. Mort, A. L. Roberts, H. S. Sawyer.

HUNTER : ARTHUR, Deputy County Architect, County Architect's Office, Kirkcudbright ; 14 Victoria Park, Kirkcudbright. J. McL. Bowie, A. M. McMichael, A. N. Malcolm.

KNEEN : CLAUDE JENNINGS, P.A.S.I. (Capt. R.E.), c/o The Borough Architect, Barking, Essex ; c/o 45 Water Lane, Seven Kings, Essex. A. J. Davidson and applying for nomination by the Council under Bye-law 3 (*d*).

KNOTT : ROBIN DAGWORTHY, c/o Messrs. J. Stanley Beard & Bennett, 101-3 Baker Street, W.1 ; 78 Worthing Road, Horsham, Sussex. J. Stanley Beard and applying for nomination by the Council under Bye-law 3 (*d*).

MACKINTOSH : JAMES WILSON, 11 Orchard Street, Bristol ; 188A, Cranbrook Road, Bristol, 6. W. H. Watkins, A. J. Knott, C. F. W. Dening.

MACMINN : JOHN, Ministry of Works, Viceroy Close, Bristol Road, Birmingham ; Linsdale, 182 Bristol Road, Birmingham. J. Macgregor, S. E. Castle, John Grey.

MATTHEW : BASIL ROLAND, Holborn Town Hall, W.C.1 ; Small Oaks, Crays Pond, Goring Heath, Oxon. C. C. T. Doll, P. Hickey, A. J. Butcher.

NEALE : HENRY, County Architect's Dept., Norfolk County Council, Thorpe Road, Norwich ; 33 Neville Road, Sprowston, Norwich. F. G. Limmer, L. G. Hannaford, F. H. Swindells.

NEWELL : WILLIAM FRANK, County Architect's Dept., Shire Hall, Nottingham ; 81 Pierrepont Road, West Bridgford, Nottingham. E. W. Roberts, E. Frear, F. W. C. Gregory.

NICHOLLS : CYRIL, c/o City Architect's Dept., Town Hall, Sheffield ; 9 Kennedy Road, Woodseats, Sheffield, 8. W. G. Davies, J. M. Jenkinson, H. B. Leighton.

PARSLOW : WILLIAM EDWARD, c/o Messrs. Hodgson's Kingston Brewery Co., Ltd., Kingston-on-Thames ; 44 Avenue Road, Kingston-on-Thames. E. B. Glanfield, H. M. Fletcher, D. L. Solomon.

ROSE : JOHN NEIL, County Architect's Dept., County Hall, Hertford ; 48 Fordwich Rise, Hertford. C. H. Aslin and applying for nomination by the Council under Bye-law 3 (*d*).

SHERWIN : BERNARD, c/o County Architect's Dept., Shire Hall, Nottingham ; 138 Gordon Road, West Bridgford, Notts. E. W. Roberts, E. Frear, H. H. Dawson.

SIBTHORP : THOMAS, P.A.S.I., A.M.T.P.I., St. Pancras Borough Council, St. Pancras Town Hall, Euston Road, N.W.1 ; 19 Frinton Drive, Woodford Green, Essex. Cecil Kennard, the late E. G. Culpin, T. J. Rushton.

TAYLOR : ALBERT EDWARD MAURICE, c/o Messrs. Cripps & Stewart, 123 London Road, Headington, Oxford ; 73 Windmill Road, Headington. G. R. Hutton, C. B. Stewart, Sir Charles Nicholson.

THORPE : GEOFFREY HEREWARD, c/o Arcon, 81 Piccadilly, W.1 ; 16 De Frene Road, Sydenham, S.E.26. Raglan Squire, H. D. Hendry, Joseph Hill.

TOMLIN : KENNETH JOHN, Ivy Cottage, Fittleworth, Sussex. S. H. Burdwood, Niel Martin-Kaye, W. E. Trent.

WILKINSON : ARTHUR, 21 Bunhill Row, E.C.1 ; 94 Gladstone Park Gardens, N.W.2. L. M. Gotch, The Hon. John Seely, S. B. Caulfield.

WOOLHOUSE : FRANK LESLIE, Messrs. Nicholas & Dixon-Spain, 19 Hanover Square, W.1 ; 41 Ryedale, S.E.22. J. E. Dixon-Spain, Charles Nicholas, H. O. Hamilton.

ELECTION : 6 MAY 1947

An election of candidates for membership will take place on 6 May 1947. The names and addresses of the overseas candidates, with the

names of their proposers, are herewith published for the information of members. Notice of any objection or any other communication respecting them must be sent to the Secretary, R.I.B.A., not later than Saturday, 26 April 1947.

The names following the applicant's address are those of his proposers.

AS FELLOW (1)

SCAMMELL : RODNEY QUINTON (Lieut.Co. R.E.) [*A.* 1929], Messrs. Cobb, Archer & Scammell, P.O. Box 58, Stanley House, Hardinge Street, Nairobi, Kenya Colony : Spring Valley Estate, Lower Kabete, Nairobi. R. S. Cobb, H. W. Hobbiss and H. D. Archer.

AS ASSOCIATES (5)

The name of a school or schools after a candidate's name indicates the passing of a recognised course.

ANNABELL : MILTON SPURDLE (Univ. Coll. Auckland, New Zealand, Sch. of Arch.), 23 Mewburn Avenue, Mt. Eden, Auckland, N.Z. C. R. Ford, W. H. Gummer, W. G. Young.

DE LISLE : AUBREY FRANK (Univ. Coll., Auckland, New Zealand, Sch. of Arch.), c/o Messrs. Edgecumber, White & Leigh, South British Buildings, Hamilton, N.Z. Applying for nomination by the Council under Bye-law 3 (*d*).

GERSON : WOLFGANG (Arch. Assoc., London), 471 Argyle Avenue, Westmount, P.Q., Canada. G. D. G. Hake, J. C. McDougall, E. H. Button.

SMUTS : DAVID ADRIAN FERRIS [Passed a qualifying Exam. approved by the I.S.A.A.] Country Club, Auckland Park, Johannesburg, S. Africa. A. J. Marshall, James Morris and applying for nomination by the Council under Bye-law 3 (*d*).

THOMAS : RICHARD PAGET [Special Final Exam.], P.O. Box 365, Salisbury, Southern Rhodesia. J. R. Hobson, I. D. MacGillivray, D. MacGillivray.

AS LICENTIATE (1)

PETRIE : ADAM MACFARLANE, Public Works Dept., Sudan Government, Juba, Sudan. Applying for nomination by the Council under Bye-law 3 (*d*).

MEMBERS' COLUMN

This column is reserved for notices of changes of address, partnership and partnerships vacant or wanted, practices for sale or wanted, office accommodation, and personal notices other than for posts wanted as salaried assistants for which the Institute's Employment Register is maintained.

APPOINTMENTS

MR. LESLIE H. J. HEYWOOD [*A.*], formerly Senior Assistant Architect, West Riding of Yorkshire County Architect's Department, has been appointed Chief Assistant Architect (Public Buildings) in the City of Leeds Architect's Department.

MR. E. C. COLEMAN HICKS [*A.*] has been appointed Senior Architect (Aviation) to the Government of India. His address for trade catalogues, etc., is Senior Architect's Office, Room 55, Department of Civil Aviation, Talkatora Barracks, New Delhi.

MR. S. K. JOGLEKAR [*A.*] has, since his arrival in India in February 1946, been appointed as a Deputy Town Planner to H.E.H. the Nizam's Local Government Department.

PRACTICES AND PARTNERSHIPS

MR. H. CAMERON BEAUMONT [*A.*] practising privately at 78 Torr Lane, Hartley, Plymouth, will be pleased to receive trade catalogues, etc.

The address of MR. FRANK DOWDESWELL [*F.*], inadvertently omitted from the new edition of the Kalendar, is 140 Sussex Way, Cockfosters, Barnet, Herts.

MR. P. W. T. ELFORD [*L.*] has retired from the firm of Elford, Evans & Sloggett (successors to Barron, Rooke & Partners) and is commencing practice on his own account at 1 St. Andrew Street, Plymouth, where he will be pleased to receive trade catalogues, etc.

MR. P. J. MABLEY [*A.*], on release from the Forces, has joined with Mr. D. L. Bennett and Mr. F. A. Davies in practice under the style of Mabley, Bennett & Davies at 5 Weymouth Mews, Weymouth Street, W.1, where he will be pleased to receive trade catalogues, etc.

MR. B. A. PHILLIPS-HOWARD [*A.*] is now practising at The White House, Windsor Lane, Burnham, Bucks. (Burnham, Bucks. 606) and will be pleased to receive trade catalogues, etc.

MR. A. R. SCRIVENER [*F.*], practising under the style of "R. Scrivener & Sons" at Howard Place, Hanley, Stoke-on-Trent (Stoke-on-Trent 2215-6), is taking into partnership the following members of his staff :—Mr. Lindon Marks [*A.*], Mr. Arthur Powell [*L.*] and Mr. Colin Grocott.

MR. SYDNEY J. SQUIRE [*L.*] has terminated his connection with Messrs. Alan Pipe & Sons and has commenced practice at 89 Oaks Avenue, Worcester Park, Surrey (Derwent 3283).

MR. WILLIAM E. WOLFF [*A.*] has resumed practice at 81 Fleet Street, Torquay, and will be pleased to receive trade catalogues, etc.

CHANGES OF ADDRESS

MR. J. GODFREY GILBERT [*A.*] has removed from 59 Chatsworth Court, Pembroke Road, London, W.8, to "White Lodge," Coldharbour Lane, Bushey, Herts. (Bus. 1822), where he will be pleased to receive trade catalogues, etc.

MR. ANDREW L. GRAY (late Squadron Leader, R.A.F.) is now practising at 2a Simpsons Road, Bromley, Kent, where he will be pleased to receive trade catalogues, etc.

MR. ALBERT EDWARD JONES [*A.*] has removed from 20 Torver Road, Harrow, Middlesex, to 4 Hillbury Avenue, Kenton, Middlesex.

MR. CHARLES D. MCINTOSH [*L.*] has removed from 96 Grappenhall Road, Stockton Heath, to 12 Winmarleigh Street, Warrington, and will be pleased to receive trade catalogues, etc., at that address.

MR. MARSHALL SISSON [*F.*] is now practising at Farm Hall, Godmanchester, Hunts. (Huntingdon 363), where he will be pleased to receive trade catalogues, etc., and at 47 North Hill, Colchester (Colchester 4642).

MR. W. WYLTON TODD [*A.*] has removed to 2 Millbank House, Westminster, London, S.W.1 (Whitehall 5045).

PRACTICES AND PARTNERSHIPS WANTED AND AVAILABLE

ASSOCIATE, aged 35, good general experience, some prospective work seeks partnership, or post leading to early partnership in established practice, preferably London.—Apply Box 351, c/o The Secretary, R.I.B.A.

ASSOCIATE offers partnership in established London practice. Premium returnable as salary over three years, or succession might be arranged during that period.—Apply Box 352, c/o The Secretary, R.I.B.A.

FELLOW, practising in London, would be pleased to consider applications for Junior Partnership, preferably from Member with Town Planning qualification (age 30-40) salary and percentage profits basis. Extensive housing practice, flats, etc., in London and Home Counties.—Apply Box 354, c/o The Secretary, R.I.B.A.

PARTNERSHIP, or assistantship leading to partnership, required by Associate, Dip.Arch.Dist.(Lvpl.), Cert. Town Planning. Ten years' practical experience. South England preferred.—Apply Box 350, c/o The Secretary, R.I.B.A.

WANTED, competent qualified assistant with view to early partnership. West Riding, Yorkshire, practice.—Apply Box 353, c/o The Secretary, R.I.B.A.

MEMBERS RELEASED FROM THE SERVICES, ETC.

The following members have notified the R.I.B.A. that they have been released from the Services and are resuming practice and would be pleased to receive trade catalogues, information sheets and other data, etc. :—

MR. C. DUNCAN OSTICK [*A.*], late Capt. R.E., c/o Northern Ireland Housing Trust, Donegal Square South, Belfast.

MR. D. B. PEACE [*A.*] (late Squadron Leader, R.A.F.), Vernon Cottage, The Yeld, Bakewell, Derbyshire.